

PRELIMINARY DOCUMENTATION

Waddi Wind Farm (EPBC 2023/09639)

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REPORT

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Prepared by:

RPS

Margaret McCormack
Senior Environmental Consultant

Level 3, 500 Hay Street
Subiaco, WA 6008

T +61 8 9211 1111
E margaret.mccormack@rpsconsulting.com

Prepared for:

Waddi Wind Farm Pty Ltd as trustee of Waddi Wind Farm Project Trust

Peta Brunel
Senior Environment and Development Planner

L24/600 Bourke Street
Melbourne, VIC 3000

T 0488 468 746
E peta.brunel@tiltrenewables.com

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GLOSSARY

Term / acronym	Description
ACCS	Annual Climate Change Statement 2024
AMC	Australian Marine Complex
ATSIHP Act	<i>Aboriginal and Torres Strait Islander Heritage Protection Act 1984</i>
Barotrauma	Bodily injury caused by changes in barometric (air) pressure
BC Act	<i>Biodiversity Conservation Act 2016</i>
BCE	Bamford Consulting Ecologists
cm	Centimetres
DAWE	Department of Agriculture, Water and the Environment
dB(A)	Decibel
DBCA	Department of Biodiversity, Conservation and Attractions
DBH	Diameter at Breast Height
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DEC	Department of Environment and Conservation
DEE	Department of the Environment and Energy
DEWHA	Department of Environment, Water, Heritage and the Arts
Disturbance Area	The Disturbance Area (138.4 ha) represents the physical footprint required to construct and operate the Waddi Wind Farm and transmission line infrastructure components of the Proposed Action. This area represents approximately 1.3 per cent of the Project Area and approximately 10.9 per cent of the Indicative Works Area.
DPaW	Department of Parks and Wildlife
DPLH	Department of Planning, Lands and Heritage
DPIRD	Department of Primary Industries and Regional Development
DSEWPac	Department of Sustainability, Environment, Water, Population and Communities
DWER	Department of Water and Environmental Regulation
EP Act	<i>Environmental Protection Act 1986</i>
EPA	Environmental Protection Authority
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
Feather spot	A clump of five feathers or more
GPS	Global Positioning System
ha	Hectare
IBRA	Interim Biogeographical Regionalisation of Australia
Indicative Works Area	The Indicative Works Area (1,226.6 ha) is the area within which the Waddi Wind Farm and transmission line infrastructure components are proposed to be sited. This area represents approximately 11.7 per cent of the broader Project Area.
km	Kilometre
kV	Kilovolt
LAeq	Equivalent continuous sound pressure level
LPS	Local Planning Scheme
m	Metres
m AHD	Metres Australian Height Datum
mg/L	Milligrams per litre
mm	Millimetres
MNES	Matters of National Environmental Significance
MW	Megawatt

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Term / acronym	Description
Native Vegetation Clearing Area	The Native Vegetation Clearing Area (5.5 ha) represents the portion of the Disturbance Area where native vegetation clearing will be undertaken. This area represents approximately 0.05% of the Project Area, approximately 0.4% of the Indicative Works Area and approximately 4% of the Disturbance Area.
OSOM	Oversize overmass
Proposed Action	The Proposed Action is to construct and operate the Waddi Wind Farm development proposed with up to 18 wind turbines and associated infrastructure, including an overhead 132 kV transmission line from an on-site substation into Western Power's existing transmission network.
Project Area	The Project Area (10,493.7 ha) follows the cadastral property boundaries for the Waddi Wind Farm components and the proposed land tenure of the transmission line infrastructure component. The Project Area represents the area of land for which the Proponent has agreements in place with relevant parties to undertake the Proposed Action.
Proponent	The Proponent is the Waddi Wind Farm Pty Ltd as Trustee for Waddi Wind Farm Project Trust, a subsidiary of the portfolio of companies trading as Tilt Renewables.
PDWSA	Public Drinking Water Source Areas
RPS	RPS AAP Consulting Pty Ltd
RSA	Rotor Swept Area
SRE	Short range endemics
SWALSC	South West Aboriginal Land and Sea Council
SWIS	South West Interconnected System
TEC	Threatened Ecological Community
TMP	Traffic Management Plan
TSSC	Threatened Species Scientific Committee
uS/cm	Microsiemens per centimetre
UXO	Unexploded ordnance
WC Act	<i>Wildlife Conservation Act 1950</i>
WEM	Wholesale Electricity Market

EXECUTIVE SUMMARY

Waddi Wind Farm Pty Ltd as trustee of Waddi Wind Farm Project Trust is proposing to construct and operate the Waddi Wind Farm. The Waddi Wind Farm is a renewable energy development, comprising up to 18 wind turbines and is designed to generate enough combined renewable energy to power 68,000 homes per year. The 10,491-hectare (ha) Project Area, within which the Waddi Wind Farm will be constructed and operated, is located approximately 12 kilometres (km) north-west of Dandaragan in Cooljarloo, Western Australia.

The Waddi Wind Farm was referred under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) in August 2023. The referral (EPBC 2023/09639) was determined to be a controlled action on 13 November 2023 by the Department of Climate Change, Energy the Environment and Water (DCCEEW), which requires the Waddi Wind Farm to undergo assessment and approval under the EPBC Act.

The Project Area has been the subject of a significant body of site-specific ecological investigations spanning 17 years between 2008 to 2025. This extensive suite of site-specific ecological investigations has informed an avoidance-led approach to the wind farm design, ensuring future infrastructure would be positioned within previously disturbed areas wherever possible to avoid impacts to Matters of National Environmental Significance (MNES) as far as practicable.

Furthermore, a technical review of Carnaby's cockatoo night-roosting and flock movement behaviours in the localities of Cooljarloo, Cataby and Badgingarra by Murdoch University (2024) and recent real time monitoring data from the Badgingarra and Yandin wind farms between 2019 and 2024 (Ecoscape 2018, Ecoscape 2019a, Ecoscape 2019b, Ecoscape 2020, Alinta Energy 2022, Alinta Energy 2024) have been used to understand the regional flock movements and inform the likely collision risk presented by the Waddi Wind Farm to Carnaby's cockatoo and migratory birds.

Matters of National Environmental Significance

The EPBC Act listed threatened species, threatened ecological community and migratory birds identified by DCCEEW that could potentially be impacted by the Waddi Wind Farm are:

- Listed threatened species and community:
 - Carnaby's cockatoo (*Zanda latirostris*) (Endangered)
 - Curlew sandpiper (*Calidris ferruginea*) (Critically Endangered)
 - Sharp-tailed sandpiper (*Calidris acuminata*) (Vulnerable)
 - Banksia woodlands of the Swan Coastal Plain threatened ecological community (TEC) (Endangered)
 - Star sun-orchid (*Thelymitra stellata*) (Endangered)
 - Dwarf green kangaroo paw (*Anigozanthos viridis* subsp. *terraspectans*) (Vulnerable)
 - Lesueur hakea (*Hakea megalosperma*) (Vulnerable)
 - Sandplain duck orchid (*Caleana dixonii*) (Endangered)
 - Glossy-leafed hammer orchid (*Drakaea elastica*) (Endangered)
- Migratory bird species:
 - Curlew sandpiper (*Calidris ferruginea*) (Migratory)
 - Fork-tailed swift (*Apus pacificus*) (Migratory)
 - Sharp-tailed sandpiper (*Calidris acuminata*) (Migratory)
 - Pectoral sandpiper (*Calidris melanotos*) (Migratory)
 - Common sandpiper (*Actitis hypoleucos*) (Migratory).

Potential impacts on these Matters of National Environmental Significance (MNES) due to habitat clearance, habitat fragmentation, and through turbine and transmission line collision and barotrauma have been assessed for significance against relevant guidelines. This Preliminary Documentation provides the

additional information required by DCCEEW on the identified MNES for assessment under the EPBC Act. To support this assessment the following information has been provided:

- Details on the Proposed Action (Section 1.3) and previous associated actions (Section 3.1).
- Information on the Proponent (Section 2).
- Overview of the historical proposals for the Proposed Action, together with the history of environmental approvals and impact avoidance measures (Section 3).
- Local and regional context of the Project Area, including flora, vegetation and fauna values that have been identified from site specific surveys (Section 4).
- Additional information on the identified MNES (Section 5).
- Potential direct and indirect impacts during vegetation clearing, construction and operation of the Proposed Action and an assessment of their significance (Section 6).
- Proposed avoidance and mitigation measures (Section 7).
- Residual impacts and proposed offsets to counterbalance the predicted impacts (Section 8).
- Other approvals and conditions that the Proposed Action is required to address (Section 9).
- Social and economic information relating to the Proposed Action (Section 10).
- Demonstration that the Proposed Action is compliant with the five principles of ecologically sustainable development (Section 11) and Australia's national and international obligations (Section 12).

Key findings overview

The key findings of this Preliminary Documentation in relation to the identified MNES are:

- The Project Area is characterised by a variety of habitats but is primarily cleared agricultural land with remnant patches of native vegetation. Within the transmission line alignment Badgingarra Conservation Park (Lot 4134 on Deposited Plan 240347; Crown reserve 41986) and Lot 3901 on Deposited Plan 209568 (Crown Reserve 27216) represent consolidated vegetation extents.
- All known Carnaby's cockatoo breeding areas and night-roosts have been avoided during wind farm design (BCE 2025). The extent of Carnaby's cockatoo foraging, potential breeding and potential roosting habitat proposed to be permanently lost to facilitate construction of the Waddi Wind Farm has been reduced to be as low as reasonably practicable.
- Over 18,000 ha of potential Carnaby's cockatoo foraging habitat has been identified within conservation estates within 12 km of the Project Area. There are also substantial areas of Carnaby's cockatoo habitat outside of conservation estates and Crown reserves that are utilised for foraging, roosting and nesting.
- In Cataby, Cooljarloo and Badgingarra, Carnaby's cockatoo flock movements generally occur along lowland vegetation corridors within valleys, which accords with foraging, roosting and breeding habitat requirements of this species. A high number of Carnaby's cockatoo sightings were in the lower landscape along the Project Area's eastern boundary, with occasional forays of smaller groups across higher ground in the south and centre (BCE 2025). Carnaby's cockatoo is considered to be at low risk of collision or barotrauma from the operating Waddi Wind Farm turbines.
- The habitat types identified within the Project Area do not align with the migratory sandpiper species' preferred habitats. These species are considered extremely unlikely to traverse the Project Area and will not be impacted by habitat loss, fragmentation or degradation because of the Waddi Wind Farm. Pre-development and operational monitoring data from neighbouring Badgingarra and Yandin wind farms have not detected any migratory sandpiper species.
- The fork-tailed swift is almost exclusively aerial. Due to the broad range of habitats that this species overflies, its likelihood to occur very infrequently over the Project Area and its widespread occurrence it is not anticipated that a minor reduction of vegetation within the Project Area would materially impact this species. Fork-tailed swift may fly at the height of the turbines however it has considerable aerial ability and is likely to easily avoid collision.

- Pre-development and operational monitoring data from neighbouring Badgingarra and Yandin wind farms have not detected any migratory bird species.
- Over 53,000 ha of Banksia woodlands of the Swan Coastal Plain ecological community has been recorded within 25 km of the Project Area. There is 0.3 ha, or 0.0005% of the Banksia woodlands of the Swan Coastal Plain TEC within 25 km of the Project Area, proposed to be permanently lost. This loss has been reduced as far as practicable and is not expected to result in a significant impact to the Banksia woodlands of the Swan Coastal Plain TEC across local and regional scales.
- No star sun-orchid, dwarf green kangaroo paw or Lesueur hakea individuals or populations are proposed to be permanently lost.
- The habitat types identified within the Project Area do not align with the glossy-leafed hammer orchid preferred habitat conditions. The glossy-leafed hammer orchid and sandplain duck orchid are likely to be locally absent from the Project Area.

Avoidance and mitigation measures

The Proponent's development process for the Proposed Action has been informed at all stages by the implementation of a mitigation hierarchy framework, an international best practice approach for addressing biodiversity risks and opportunities by prioritising actions to avoid environmental harm before sequentially considering opportunities to minimise, restore/remediate, then offset residual impacts.

Avoidance actions undertaken during development of the Waddi Wind Farm have resulted in most the Project Area's ecological values being maintained. These actions have resulted in:

- Avoidance of direct impacts to all known records of Commonwealth listed Threatened flora species identified within the Project Area, including star sun-orchid, dwarf green kangaroo paw and Lesueur hakea
- Avoidance of at least 147.57 ha (or 96%) of the native vegetation surveyed by RPS (2023), Ecologia Environment (2016), Outback Ecology (2014) and Outback Ecology (2010) as part of the ecological assessments undertaken for the Proposed Action
- Avoidance of at least 12.4 ha (or 98%) of Banksia woodlands of the Swan Coastal Plain TEC within the Project Area
- Avoidance of at least 143.54 ha (or 96%) of native vegetation within and proximate to the Project Area identified as high-quality Carnaby's cockatoo foraging habitat by the flora, vegetation and fauna surveys
- Avoidance of at least 1,063.18 ha (or 99%) of native vegetation within the Project Area identified as potential foraging habitat for Carnaby's cockatoo by government mapped Native Vegetation Extent (DPIRD-005) intersected by Vegetation Associations 7, 1030 and 1031 (DPIRD-006).
- Avoidance of at least 71.51 ha (or 93%) of government mapped Native Vegetation Extent (DPIRD-005) intersected by Vegetation Association 7 (DPIRD-006), where its vegetation descriptions are characteristic of potential roosting and breeding habitat for Carnaby's cockatoo.
- Avoidance of at least 68 pine trees (or 76%) of the pine trees identified by Terrestrial Ecosystems (2022) identified as high-quality Carnaby's cockatoo foraging and potential roosting habitat.
- Avoidance of at least 63 marri trees (or 95%) of the marri trees identified by Terrestrial Ecosystems (2022) identified as high-quality Carnaby's cockatoo foraging, potential breeding and potential roosting habitat. This includes all 11 marri trees identified by Terrestrial Ecosystems (2022) as having suitably sized hollows to support Carnaby's cockatoo nesting.
- Avoidance of at least 732 planted trees (non-native eucalypts) (or 99%) of the planted trees identified by Terrestrial Ecosystems (2022) identified as low-quality Carnaby's cockatoo foraging and potential roosting habitat.
- Avoidance of at least 78 coastal blackbutt (*Eucalyptus tottiana*) trees (or 100%) which are of foraging and roosting value to Carnaby's cockatoo.

Proposed management actions and monitoring to be implemented during pre-construction, construction and operation to mitigate potential direct and indirect environmental impacts are listed in Table 23.

A draft Bird and Bat Management Plan (RPS 2025) has been prepared to mitigate and manage potential impacts to Carnaby's cockatoo, migratory birds, State-listed and common local bird species associated with individual mortality from turbine and potentially transmission line collision, and potential changes to species utilisation of the Project Area.

Residual impacts

The significance of impacts associated with the Proposed Action have been assessed in this Preliminary Documentation for the identified MNES. It was concluded that the primary residual risk from the Waddi Wind Farm is from the permanent loss of high quality Carnaby's cockatoo foraging habitat, potential breeding and potential roosting habitat due to vegetation clearing. Specifically:

- Permanent loss of up to 5.33 ha of native vegetation identified as high-quality Carnaby's cockatoo foraging habitat, which amounts to 0.013% of the identified potential Carnaby's cockatoo foraging habitat within 12 km of the Project Area (40,156.22 ha; Figure O).
- Permanent loss of up to 21 pine trees identified as high-quality Carnaby's cockatoo foraging and potential roosting habitat, which amounts to 24% of the pine trees identified by Terrestrial Ecosystems (2022)
- Permanent loss of up to 3 marri trees identified as potential Carnaby's cockatoo breeding, high-quality foraging and potential roosting habitat, which amounts to 5% of the marri trees identified by Terrestrial Ecosystems (2022). None of the 3 marri trees have Carnaby's cockatoo nesting hollows
- Permanent loss of up to 11 planted trees (non-native eucalypts) identified as low-quality Carnaby's cockatoo foraging and potential roosting habitat, which amounts to 1% of the planted trees (non-native eucalypts) identified by Terrestrial Ecosystems (2022)
- The permanent loss of 5.33 ha of high quality Carnaby's cockatoo foraging habitat will not materially diminish local or regional stocks of potential foraging habitat for this species. The permanent loss of 21 pine trees, 3 marri trees and 11 planted trees (non-native eucalypts) will not materially diminish the local or regional stock of potential breeding and potential roosting opportunities available for Carnaby's cockatoo. The existing Carnaby's cockatoo flock movement patterns in the Cooljarloo, Cataby and Badgingarra areas are unlikely to be materially altered by the permanent loss of a minor extent of Carnaby's cockatoo habitat.

There is a low residual risk to threatened flora species and Banksia woodlands of the Swan Coastal Plain TEC due to vegetation clearing. There is a low risk to Carnaby's cockatoo and migratory birds from collision. The operation of the Waddi Wind Farm is considered unlikely to materially increase the cumulative risk to Carnaby's cockatoo or migratory birds from collision, above that which already exists, from the operation of the Badgingarra, Emu Downs and Yandin wind farms.

Informed by the significance of impacts assessment undertaken for Carnaby's cockatoo, the permanent loss of foraging, potential breeding and potential roosting habitat is likely to be a significant impact. An Offset Management Strategy (Surefire Environmental Pty Ltd 2025) has been prepared to counterbalance the permanent loss of Carnaby's cockatoo habitat. The remaining potential impacts to Carnaby's cockatoo, which include collision, fragmentation, degradation and disturbance, are unlikely to be of significance. Potential impacts to migratory bird species, threatened flora species and the Banksia woodlands of the Swan Coastal Plain TEC are not expected to be of significance.

On this basis, the Proposed Action should be approved under the EPBC Act.

Actions that could be conditioned as part of the EPBC Act approval include implementation of the proposed management actions and monitoring during pre-construction, construction and operation to mitigate potential direct and indirect environmental impacts listed in Table 23.

1 INTRODUCTION

1.1 Background

The Waddi Wind Farm is a proposed renewable energy development comprising up to 18 wind turbines and associated infrastructure. The Waddi Wind Farm is anticipated to generate enough combined renewable energy to power 68,000 homes per year and result in a reduction of 286,000 tonnes of carbon emissions by offsetting traditional (fossil fuel-derived) power generation.

The Waddi Wind Farm was referred to the Department of Climate Change, Energy, the Environment and Water (DCCEEW) in August 2023 by Waddi Wind Farm Pty Ltd as trustee of Waddi Wind Farm Project Trust (the Proponent), a subsidiary of a portfolio of companies that are trading as Tilt Renewables.

On 13 November 2023, a delegate of the Minister for the Environment and Water decided that the Waddi Wind Farm is likely to have a significant impact on matters protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), specifically threatened species and communities and migratory birds. It was determined that the Waddi Wind Farm was a controlled action to be assessed by Preliminary Documentation in accordance with Sections 75 and 87 of the EPBC Act.

On 22 December 2023, DCCEEW requested additional information to assess the impacts of the Waddi Wind Farm pursuant to Section 95A(2) of the EPBC Act (Appendix A). The threatened species, threatened community and migratory birds identified by DCCEEW that could potentially be impacted by the Waddi Wind Farm are:

- Listed threatened species and community:
 - Carnaby's cockatoo (*Zanda latirostris*) (Endangered)
 - Curlew sandpiper (*Calidris ferruginea*) (Critically Endangered)
 - Sharp-tailed sandpiper (*Calidris acuminata*) (Vulnerable)
 - Banksia woodlands of the Swan Coastal Plain threatened ecological community (TEC) (Endangered)
 - Star sun-orchid (*Thelymitra stellata*) (Endangered)
 - Dwarf green kangaroo paw (*Anigozanthos viridis* subsp. *terraspectans*) (Vulnerable)
 - Lesueur hakea (*Hakea megalosperma*) (Vulnerable)
 - Sandplain duck orchid (*Caleana dixonii*) (Endangered)
 - Glossy-leafed hammer orchid (*Drakaea elastica*) (Endangered)
- Migratory bird species:
 - Curlew sandpiper (*Calidris ferruginea*) (Migratory)
 - Fork-tailed swift (*Apus pacificus*) (Migratory)
 - Sharp-tailed sandpiper (*Calidris acuminata*) (Migratory)
 - Pectoral sandpiper (*Calidris melanotos*) (Migratory)
 - Common sandpiper (*Actitis hypoleucos*) (Migratory).

Potential impacts on these Matters of National Environmental Significance (MNES) due to habitat clearance, habitat fragmentation, and through turbine and transmission line collision and barotrauma were assessed for significance against relevant guidelines. The Proponent prepared the Preliminary Documentation to address the additional information required by DCCEEW for assessment under the EPBC Act, which was submitted to DCCEEW in April 2024.

On 28 May 2024, DCCEEW requested additional information to assess the impacts of the Proposed Action pursuant to Section 95A(2) of the EPBC Act (Appendix A). The Proponent undertook ecological surveys and prepared this amended Preliminary Documentation to address the additional information required by DCCEEW for assessment under the EPBC Act. The requested additional information from December 2023 and May 2024 has been reproduced in the DCCEEW request for additional information checklist (Appendix

B). This checklist identifies where the requested additional information has been provided in this Preliminary Documentation.

Meetings were held with DCCEEW officers on 17 January 2024, 5 February 2024, 3 May 2024, 21 May 2024, 12 July 2024, 16 August 2024 and 23 January 2025 to discuss and confirm the approaches proposed by the Proponent to address the Commonwealth's additional information requirements.

1.2 Purpose of this Preliminary Documentation

The purpose of this Preliminary Documentation is to present:

- The information contained in the original referral.
- The requested additional information on the impacts of the Proposed Action.
- The steps taken during development of the Proposed Action to avoid impacts on MNES.
- Measures proposed during construction and operation to mitigate and / or offset residual impacts which are unable to be avoided.
- Any other relevant information on the matters protected by the EPBC Act.

This Preliminary Documentation provides the necessary information to allow for the Minister (or delegate) to make an informed decision on whether to approve the Waddi Wind Farm under the EPBC Act.

This Preliminary Documentation has been prepared in accordance with the following standards, policies and other guidance material published by DCCEEW:

- Matters of National Environmental Significance: Significant Impact Guidelines 1.1 (Department of the Environment 2013)
- EPBC Act Policy Statement 2.3: Wind Farm Industry (Department of Environment, Water, Heritage and the Arts (DEWHA) 2009)
- EPBC Act Policy Statement 3.21—Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species (Commonwealth of Australia 2017)
- Draft Survey Guidelines for Australia's Threatened Orchids (Commonwealth of Australia 2013)
- *Referral guideline for 3 WA threatened black cockatoo species* (Department of Agriculture, Water and the Environment (DAWE) 2022). The species concerned are Carnaby's cockatoo (*Zanda latirostris*), Baudin's cockatoo (*Zanda baudinii*) and forest red-tailed black cockatoo (*Calyptorhynchus banksia naso*)
- *Environment Protection and Biodiversity Conservation Act 1999* Environmental Offsets Policy (Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) 2012)
- Draft Onshore wind farm guidance - best practice approaches when seeking approval under Australia's national environment law (DCCEEW 2024p¹)
- Environmental Management Plan Guidelines (DCCEEW 2024r)
- Guidelines for biological survey and mapped data (Department of the Environment and Energy (DEE) 2018)
- Guide to providing maps and boundary data for EPBC Act projects (DAWE 2021)

1.3 Proposed Action details

The Proposed Action is to construct and operate the Waddi Wind Farm. The Waddi Wind Farm is a proposed renewable energy development comprising up to 18 wind turbines and associated infrastructure, including an overhead 132 kilovolt (kV) transmission line from an on-site substation into Western Power's existing

¹ Noting this guidance is a draft for consultation and has not been formally published by DCCEEW.

transmission network. The Proposed Action is located approximately 12 kilometres (km) north-west of Dandaragan in Cooljarloo, Western Australia (Figure 1).

The location for the Proposed Action was selected as it has demonstrated excellent wind resources, is located in predominantly cleared agricultural lands and is well-positioned to connect into a location on the existing South West Interconnected System (SWIS) transmission network, north of the Cataby substation. This location allows for reliable export of the renewable energy generated by the Waddi Wind Farm into the electricity grid.

The Proposed Action includes the following components:

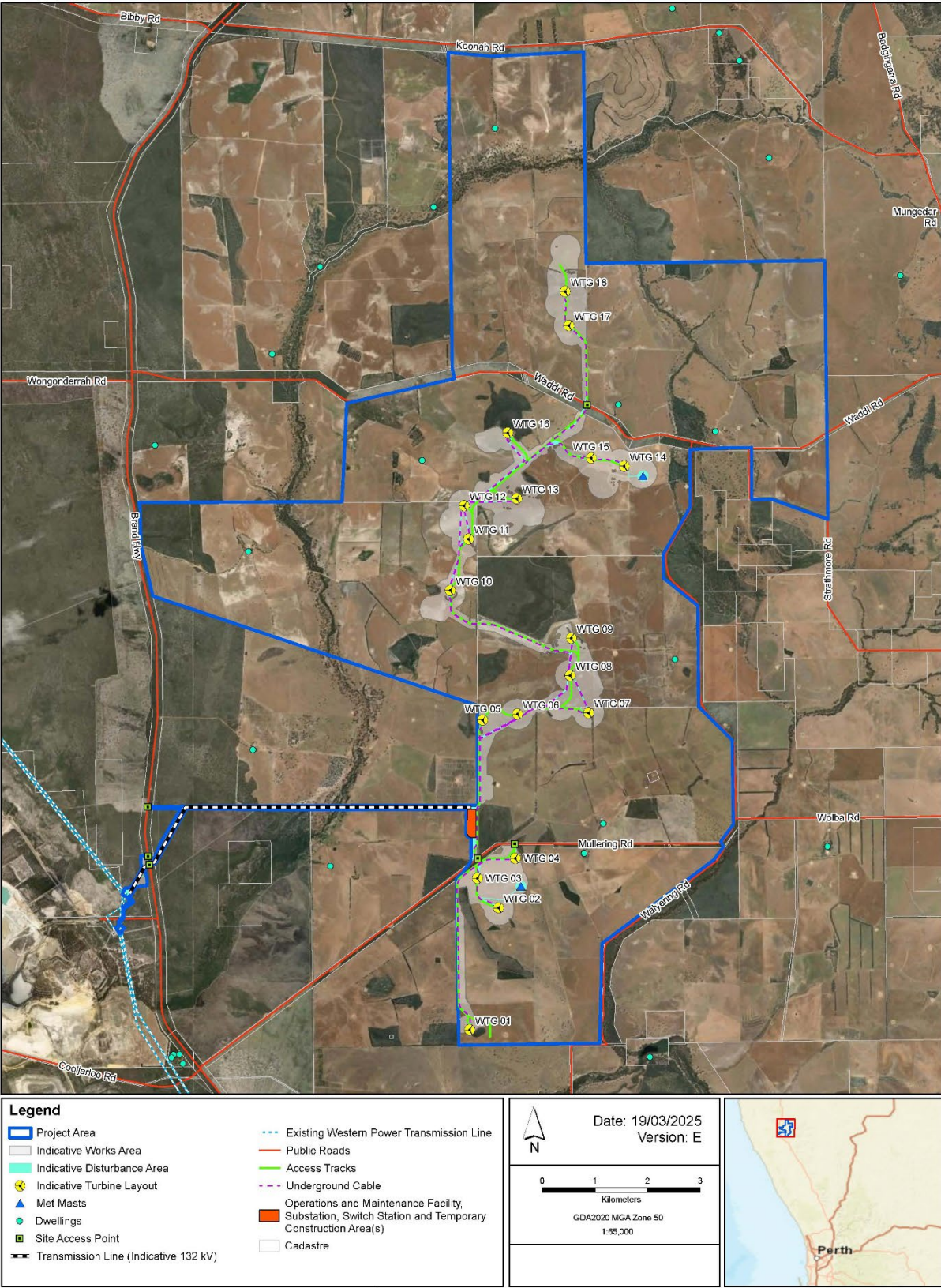
- Wind farm:
 - Up to 18 wind turbines, with a maximum turbine blade tip height of 220 m (likely to be 206 m)². The wind turbines will have a total installed indicative capacity of up to 108 megawatts (MW).
 - Up to two permanent meteorological monitoring masts for wind speed verification, weather and general monitoring purposes.
 - Internal access tracks, hardstand areas and other associated on-site infrastructure.
 - Underground electrical cabling linking the wind turbines to each other and the on-site substation.
 - An on-site substation.
 - Temporary construction facilities, including a concrete batching plant, construction compound, laydown areas and gravel borrow pits.
 - Minor upgrades to local roads, as required for the delivery, installation and maintenance of wind turbines and the related facilities.
 - An operations and maintenance facility incorporating a control room and equipment storage facilities.
- Transmission line infrastructure:
 - Up to approximately 8 km of overhead double circuit 132 kV transmission line from the on-site substation into Western Power's existing SWIS transmission network, west of the Brand Highway and north of the Cataby substation (Figure 1).
 - The transmission structures will consist of up to approximately 30 steel poles between 11 m and 40 m in height, with an average height of approximately 30 m. Spans of the conductors between the transmission poles range from 140 m to 350 m.
 - Each of the two circuits will have four conductors, three energised conductors and one optical ground wire. The optical ground wire provides lightning protection and a communications link.
 - The minimum clearance for the conductors occurs in the mid-span when sag is at a maximum with the minimum ground clearance for the conductors being approximately 7.5 m.
 - Cut-in/cut-out connection arrangements to the Pinjar – Eneabba/Emu Downs Transmission Line (PJR-ENB/EMD 81) at the point of connection to the SWIS.
 - Underground optic fibre cabling of up to approximately 1.5 km in length from the point of connection at the SWIS to the existing Western Power-operated Cataby Substation.

The Waddi Wind Farm and transmission line infrastructure will be located within the Indicative Works Area, shown in Figure 1. The precise location of these components will be confirmed as part of detailed design. Western Power will be responsible for the ongoing operation and maintenance of the transmission line infrastructure.

² The Proponent has recently sought an amendment to its Development Approval (refer to Section 9.2) to increase the height of the wind turbines to up to a maximum of 220 m. Following further design development in response to wind loadings and advice from the turbine manufacturer the final height of the turbines is expected to be approximately 206 m. This height has been used for assessment purposes as part of the Preliminary Documentation.

Locations of the gravel borrow pits are yet to be defined. The borrow pits will be sited within the Indicative Works Area and within areas surveyed and confirmed not to contain native vegetation or cultural heritage. External sources of gravel may also be used for the construction of the Proposed Action.

The relevant wind turbine components for the Proposed Action are intended to be transported from Henderson (Australian Marine Complex (AMC)) by road generally via the Tonkin and Brand highways to the Waddi Wind Farm site. All wind turbine components will be delivered via the main site access points off Mullering Road.



Waddi Wind Farm
Indicative Project Layout

Figure 1: Waddi Wind Farm – infrastructure

1.3.1 Assessment areas

The Proposed Action is comprised of the following assessment areas:

- Project Area (10,493.7 hectares (ha)), which follows the cadastral property boundaries for the Waddi Wind Farm and the proposed land tenure of the transmission line. The Project Area represents the area of land for which the Proponent has agreements in place with relevant parties to undertake the Proposed Action
- Indicative Works Area (1,226.6 ha) is the indicative area within which the Waddi Wind Farm and transmission line infrastructure components are proposed to be sited. This area represents approximately 11.7% of the broader Project Area
- Disturbance Area (138.4 ha) represents the physical footprint required to construct and operate the Waddi Wind Farm and transmission line components of the Proposed Action. This area represents approximately 1.3% of the Project Area and approximately 10.9% of the Indicative Works Area
- Native Vegetation Clearing Area (5.5 ha) represents the portion of the Disturbance Area where native vegetation clearing will be undertaken. This area represents approximately 0.05% of the Project Area, approximately 0.4% of the Indicative Works Area and approximately 4% of the Disturbance Area.

The Project Area, Indicative Works Area and the Disturbance Area are presented in Figure 1.

The Indicative Works Area and Disturbance Area have been defined following several design iterations and historic development processes that have sought to avoid and minimise environmental, social and land management impacts associated with the Proposed Action (Section 3.1).

All components of the Proposed Action are within the Indicative Works Area. Within this area, the Disturbance Area has been defined by the Proponent based on engineering and design of both the civil and electrical requirements of the Proposed Action. Based on the current level of design for the Proposed Action, the Proponent has confidence that the Disturbance Area is a true representation of the footprint required for the construction and operation of the Proposed Action.

The Disturbance Area may be subject to further refinement by the Proponent prior to construction. Should there be changes to the location of Waddi Wind Farm or transmission line infrastructure within the Project Area, these changes would be proposed within the limits of the disturbance to relevant MNES outlined in this Preliminary Documentation. Any future design changes would not result in greater levels of impact to:

- Native vegetation or MNES assessed in this Preliminary Documentation; or
- Significant impacts to any different MNES not assessed in this Preliminary Documentation.

1.3.2 Implementation

The Proposed Action is anticipated to commence construction in March 2026, with a relevant construction period of approximately 16-24 months. Operation of the Proposed Action to commence in around October 2027. The duration of the Proposed Action is approximately 30 years, with consideration to the operational maintenance programme and certification of the wind turbine components.

A summary of the indicative timing and duration of the construction, operation and decommissioning phases of the Proposed Action is provided in Table 1. These dates may be subject to change due to the timing of State and Federal approvals, as well as contractor and materials availability.

Table 1: Timing and duration of Proposed Action phases

Phase	Commencement	Cessation
Balance of plant construction	March 2026	December 2026
Turbine installation	October 2026	July 2027
Commencement of operation*	October 2027	September 2057
Decommissioning	October 2057	-

*The delay between turbine installation and commencement of operations is intended to allow for Western Power energisation works.

1.3.2.1 Construction

Construction of the Waddi Wind Farm is expected to take approximately 16-24 months, commencing with site establishment, clearance of vegetation, construction of access tracks and all other site civil works, including preparation of hardstand areas. This would be followed by excavation of the foundations and preparation of the concrete footings, which must be cured prior to installation of the wind turbines and permanent meteorological monitoring masts.

Wind turbine construction and erection can be relatively fast once the footings are prepared. The towers are erected in sections using large cranes, the nacelles lifted to the top of the towers, and finally blades lifted and bolted to the hub or preassembled on the ground and lifted as a unit. Substation, transmission line and grid connection works would be carried out in parallel.

The commissioning phase involves conducting pre-commissioning checks on all high-voltage equipment prior to connection to the network. Once the Waddi Wind Farm electrical connections have been commissioned and energised, each wind turbine is then separately commissioned and placed into service.

On completion of construction, remaining disturbed areas would be remediated to the pre-disturbance land use and all waste materials removed and disposed of appropriately.

The location of the borrow pits is yet to be defined. The borrow pits will be sited within the Indicative Works Area and within areas surveyed and confirmed not to contain native vegetation or cultural heritage.

Activities required to be undertaken prior to the commencement of the Proposed Action include:

- Surveying for unexploded ordinance (UXO) and undertaking UXO remediation (if required) within the Disturbance Area. The Disturbance Area is within the mapped extents of sites categorised as Substantial Potential for UXO (Department of Defence 2025).
- Geotechnical surveys to assess the subsurface ground conditions of the site, identify potential hazards and provide data to inform detailed design and construction decisions, ensuring stability and safety of the proposed infrastructure.
- The installation of temporary meteorological masts to provide meteorological data to improve the certainty in wind resource models and energy predictions to inform detailed design.

These activities will be undertaken subject to separate approvals and have not been assessed as part of this Preliminary Documentation.

1.3.2.2 Operation

Operational maintenance of the wind turbines and electrical balance of plant, excluding the transmission line, will be undertaken by the wind turbine original equipment manufacturer under contract with the Proponent. Anticipated annual maintenance activities include:

- A 1 to 2-day whole-of-site outage to complete routine maintenance and testing
- A maintenance schedule for each wind turbine (approximately 3–5 days per year)
- Scheduled one, three and six-monthly inspections for the electrical balance of plant.

Operational maintenance of the transmission line will be undertaken by Western Power, which maintains the asset in line with relevant technical specifications, ensuring the reliability of supply of electricity. Anticipated maintenance activities include:

- Annual vegetation inspections of all spans to identify vegetation encroachment in the clearance zone, regrowth with the potential to grow into the clearance zone before the next inspection cycle and potentially hazardous trees.
- Ongoing maintenance of the access tracks and hardstands to allow safe access for Western Power's heavy fleet vehicles (e.g. elevated work platforms).
- Emergency inspections and repairs (as required).

Western Power requires the following conductor clearances to be maintained under the transmission line, which may necessitate vegetation trimming (but no additional vegetation clearing) over the life of the asset:

- For spans between 100 m and 200 m – four m horizontal and two m vertical.

- For spans between 200 m and 350 m – ten m horizontal and four m vertical.

1.3.2.3 Decommissioning

The expected commercial life of the Waddi Wind Farm will be approximately 30 years. Decommissioning involves dismantling and removing the wind turbines and removing related infrastructure. Similar road access arrangements to construction would be required and access for large cranes and transport vehicles would be necessary to dismantle and remove the turbines. Internal access roads may be retained where requested by landowners.

All underground foundations would remain in situ. All above ground infrastructure including protruding electrical cabling, conduit and other structures would be removed and the foundations covered.

Overhead electrical cabling and powerlines would be dismantled, removed and materials reused or sold where possible. Powerline poles would also be removed. In locations where potential environmental damage from complete removal of the powerline pole outweighs the benefits, the pole may be cut off at ground level.

1.3.2.4 Works within Cooljarloo Mine

Part of the Proposed Action extends into Lot 3 on Plan 409189, which forms part of the operational Cooljarloo Mine operated by Tronox. The mine produces more than 770,000 metric tons of heavy mineral concentrate a year from strand lines using a dredging operation and dry mining techniques, with mine access via the Cooljarloo Access Road, a privately owned access road west of the Brand Highway.

The Proposed Action is separate to the mining operation on the site and is not intended to impact existing or future mine operations, including the use of or any future upgrades to the Cooljarloo Access Road.

Works associated with the Proposed Action within the Cooljarloo Mine will be confined to the spatial extent of the Indicative Works Area shown in Figure 2, with works limited to:

- The clearance of native vegetation from within and around existing Western Power access tracks connecting the existing Cataby substation north to Lot 4134 on Plan 240347
- The installation of underground fibre optic cabling from the point of transmission connection into the SWIS to the existing Western Power-operated Cataby Substation
- No above ground infrastructure is proposed within Lot 3 on Plan 408189 as part of the Proposed Action
- All construction works within the Cooljarloo Mine will be completed as part of the broader wind farm construction programme and no later than 3 years following commencement of the Proposed Action



Waddi Wind Farm

Extent of Works Proposed within Cooljarloo Mine (Lot 3 on Plan 408189)



Figure 2: Works within Cooljarloo Mine (Lot 3 on Plan 408189)

1.3.3 Environmental benefits

The Proposed Action is anticipated to have the following environmental benefits:

- Generate enough combined renewable energy to power approximately 68,000 homes per year.
- Result in a reduction of 286,000 tonnes of carbon emissions by offsetting traditional (fossil fuel-derived) power generation.
- Contribute towards the achievement of Western Australian and Commonwealth renewable energy and emissions reduction targets.
- Generate local employment during both the construction and operational phases.
- Contribute over \$1 million per annum to the local community through landowner payments, direct employment, use of local goods, services and community benefit scheme contributions.
- Offset environmental impacts where they cannot be avoided with nature positive outcomes.
- Provide additional firebreaks and improved access roads for firefighting.
- Deliver additional energy supply and enhance energy security to help meet growing demands in Western Australia.

1.4 Environmental investigations

The Proposed Action has been underpinned by the following environmental investigations:

- Carnaby's Black-Cockatoo and Fork-tailed Swift utilisation survey (Bamford Consulting Ecologists (BCE) 2025; Appendix C)
 - EPBC Act listed threatened bird species occurrence records from the Carnaby's Black-Cockatoo and Fork-tailed Swift utilisation survey (BCE 2025; Appendix D)
- Targeted star sun-orchid and sandplain duck orchid searches (RPS 2025; Appendix E)
 - EPBC Act listed threatened flora species occurrence records from the Targeted star sun-orchid and sandplain duck orchid searches (RPS 2025; Appendix D)
- Desktop analysis of black cockatoo tracking data to show movement and site utilisation of Carnaby's cockatoos in the Cataby region with reference to the Waddi Wind Farm (Murdoch University 2024; Appendix F)
- Reconnaissance flora and vegetation assessment, Waddi Wind Farm (RPS 2023; Appendix G)
- Black-Cockatoo habitat assessment for the Waddi Wind Farm transmission line alignment and the nominated areas in the adjacent farmland (Terrestrial Ecosystems 2022; Appendix H)
- Waddi Wind Farm proposed action – Cataby Supplementary Flora, Vegetation and Fauna Survey (Ecologia Environment 2016; Appendix I)
- Waddi Wind Farm Spring Flora and Vegetation Survey and Black Cockatoo Habitat Survey (Outback Ecology 2014; Appendix J)
- Fauna Assessment, Waddi Wind Farm (RPS 2010b³; RPS 2014; Appendix K)
- Avifauna Assessment Proposed Wind Farm Development Dandaragan Shire (RPS 2010a; Appendix L)
- Targeted Level 1 Vegetation and Flora Assessment Waddi (Outback Ecology 2010; Appendix M)

³ Fauna Assessment, Waddi Wind Farm (RPS 2010b) was updated to be Fauna Assessment, Waddi Wind Farm (RPS 2014)

2 PROPONENT INFORMATION

Waddi Wind Farm Pty Ltd, as trustee for Waddi Wind Farm Project Trust, is a subsidiary of a portfolio of companies that are trading as Tilt Renewables. Tilt Renewables is a leading renewable energy business with the largest ownership of wind and solar generation in Australia (Tilt Renewables 2024a).

Originally part of New Zealand based company Trustpower, Tilt Renewables was established in October 2016 as the result of a company demerger. In August 2021, Tilt Renewables' Australian business was acquired by Powering Australian Renewables, an influential renewable energy platform dedicated to driving Australian owned large-scale renewable energy projects (Tilt Renewables 2024b).

Tilt Renewables has a strong track record developing wind and solar energy facilities in Australia and New Zealand, including wind farms across Queensland, New South Wales, Victoria, South Australia and Western Australia, and solar farms in New South Wales. Tilt Renewables has an existing asset base of 480 operating turbines across nine wind farms as well as 2,066,380 installed solar nodes across two solar farms, with a total installed capacity of 1,822 MW. Tilt Renewables' pipeline of renewable energy proposals has the potential to produce more than 2,900 MW of additional renewable generation capacity.

The business and contact details of the Proponent relevant to the Proposed Action are as follows:

Table 2: Proponent business and contact details

Contact information	Details
Name	Waddi Wind Farm Pty Ltd as Trustee for Waddi Wind Farm Project Trust
Postal address	PO Box 16080, Collins Street West Melbourne VIC 8007
ABN	28 417 867 454
Name	Peta Brunel
Position	Senior Environment and Development Planner
Phone	0455 303 628
Email	peta.brunel@tiltrenewables.com

Further information on the Proponent can be sourced from the Proponent's website (<https://www.tiltrenewables.com>).

2.1 Environmental management history

Tilt Renewables aims to operate in a manner that maximises positive environmental effects, while minimising the incidence and source of negative (or adverse) environmental effects. To achieve this, Tilt Renewables' actions that may affect the environment are governed by Tilt Renewables' Environmental Policy (Appendix N).

2.1.1 Environmental policy

The Proponent is committed to protecting the environment by incorporating environmental considerations into all decision making. Key principles that the Proponent is committed to under its Environmental and Sustainability Policies (Appendix N) include:

- Considering the environmental context for development, construction and operations activities and seeking to minimise environmental impact.
- Complying with applicable legal obligations and any related planning and environmental approval conditions for each project/asset.
- Implementing systems, standards and processes to enable all activities to be carried out with regard to the Proponent's environmental principles, including regular reviews to continually improve environmental performance.
- Keeping abreast of trends in technology, regulations and community attitudes, adapting and innovating in response to a rapidly changing society, including planning for climate change.

- Developing measurable environmental objectives and targets (through a risk-based approach to environmental management), including regular reviews to continually improve the Proponent's environmental performance.
- Communicating and promoting environmental awareness and working with stakeholders to ensure positive environmental outcomes and minimising the risk of operational environmental incidents.
- Engaging quickly and effectively to respond to environmental incidents should they occur.
- Appointing capable people with appropriate skills and experience to carry out their work in a manner that is compatible with sound environmental performance.
- Providing adequate resources, equipment and training to enable employees at all levels to fulfil their responsibilities in relation to the environment and their work practices.
- Adopting measures to identify and ensure the efficient use of resources and energy, and minimisation of emissions and waste.

As part of the principles of the Tilt Renewables Sustainability Policy, the Proponent seeks to protect biodiversity and nature, among other environmental, social and governance objectives. The Proponent undertakes to monitor and minimise its impact on nature and biodiversity while ensuring compliance with relevant legal obligations and standards. The Proponent commits to best practice biodiversity and nature management through its site-specific management plans relevant to the biodiversity and nature values of each site in which the company works.

2.2 Past or present proceedings under laws

The Palmer Wind Farm, which is proposed 50 km east of Adelaide, was approved by the Mid Murray Council's Development Assessment Panel in December 2015. The approval decision was subsequently appealed to the South Australian Environment, Resources and Development Court and Supreme Court. The Supreme Court delivered a judgment on 15 November 2019 to uphold the decision of the South Australian Environment, Resources and Development Court to approve the Palmer Wind Farm Proposed Action (Tilt Renewables 2024d)⁴.

2.3 Previous EPBC Act referrals

Tilt Renewables previously referred the Waddi wind and solar farm Proposed Action under the EPBC Act in December 2018 and was granted "Not a Controlled Action" decision on 27 February 2019 (EPBC 2018/8352). Other EPBC Act referrals and decisions by related bodies corporate include:

- Nonowie Wind Farm (Tilt Renewables DevCo Pty Ltd) – EPBC 2025/10164: Lodged.
- Palmer Wind Farm (Tilt Renewables Australia Pty Ltd) – EPBC 2024/09884: Proposed Action is not a controlled action.
- Liverpool Range Wind Farm (Tilt Renewables Australia Pty Ltd) – EPBC 2022/09416: Approved subject to conditions.
- Rye Park Wind Farm (Rye Park Renewable Energy Pty Ltd) – EPBC 2020/8837: Approved subject to conditions.
- Dundonnell Wind Farm (Dundonnell Wind Farm Pty Ltd) – EPBC 2012/6657: Approved subject to conditions.
- Salt Creek Wind Farm (Salt Creek Wind Farm Pty Ltd) – EPBC 2016/7763: Proposed Action is not a controlled action.

⁴ *Stirling McGregor v Tilt Renewables Australia Pty Ltd & Ors* [2019] SASCFC 142 (15 November 2019).

3 DEVELOPMENT HISTORY AND IMPACT AVOIDANCE

3.1 Development history

The Proposed Action has a significant history, with early stages of planning and feasibility undertaken as early as 2009 by the then proponent, Wind Prospect WA Pty Ltd (Wind Prospect), following investigations into the wind resource potential at several locations across Western Australia.

3.1.1 Previous EPBC Act referrals

The Proposed Action is directly related to two previously Proposed Actions under the EPBC Act:

- Dandaragan Wind Farms (EPBC 2011/6006) – Not a controlled action.
- Waddi Wind and Solar Farm (EPBC 2018/8352) – Not a controlled action.

The Dandaragan Wind Farms proposal by Wind Prospect comprised of the Waddi Wind Farm and the Yandin Wind Farm. The proposal involved clearing approximately 1.3 ha of native vegetation (1.0 ha in relation to Waddi and 0.3 ha at Yandin) and included:

- Construction and operation of up to 151 wind turbines (57 at Waddi and 94 at Yandin) with an installed indicative capacity of up to 513 MW in total over two sites.
- Construction of up to six permanent on-site meteorological masts ('met masts').
- Construction of access tracks, hardstand areas and other associated on-site infrastructure.
- On-site electrical underground cabling connections, substations and infrastructure.
- An overhead interconnection powerline from an on-site substation to an off-site substation connecting to the Western Power transmission line.

A Planning Application was submitted to the Shire of Dandaragan in February 2011 for the Dandaragan Wind Farms proposal. In consideration of the environmental issues outlined in the Planning Application, the Dandaragan Wind Farms proposal was referred to the Western Australian Environmental Protection Authority (EPA) for assessment under Section 38 of the Western Australian *Environmental Protection Act 1986* (EP Act). The EPA considered that the likely environmental impacts of the Dandaragan Wind Farms proposal were not so significant as to warrant formal environmental assessment and subsequently determined that the proposal should be treated as "Not Assessed – Public Advice Given" (Appendix O).

The Shire of Dandaragan granted Planning Approval for the Waddi Wind Farm, as part of the combined Dandaragan Wind Farms, on 11 January 2012 (Appendix P). The Planning Approval allowed for the Waddi Wind Farm to be developed separately to the Yandin Wind Farm.

The Dandaragan Wind Farms proposal was also referred to the (then) Commonwealth Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) in June 2011. DSEWPaC determined on 9 September 2011 that the Proposed Action was "Not a Controlled Action".

A clearing permit application was submitted to the (then) Western Australian Department of Environment and Conservation (DEC). The clearing permit (CPS 4608/2) was granted in February 2012 for the Waddi Wind Farm to clear up to 1.07 ha of native vegetation.

In October 2015, the Proponent (then Trustpower) purchased the Waddi Wind Farm from Wind Prospect. The Yandin Wind Farm has since been developed by a different proponent, with operation of the wind farm commencing in October 2020.

3.1.2 Waddi Wind and Solar Farm (EPBC 2018/8352)

Waddi Wind Farm Pty Ltd as Trustee for the Waddi Wind Farm Project Trust was the proponent of a subsequent wind and solar farm proposal at the site in 2018. The proposal involved clearing approximately 1.4 ha of native vegetation and included:

- Construction and operation of up to 57 wind turbines, with a maximum turbine blade tip height of 180 m. The wind turbines had an installed indicative capacity of up to 145 MW.

- Construction of up to three permanent on-site met masts.
- Construction of a solar farm up to 50 MW.
- On-site electrical underground cabling connections, substations and infrastructure.
- Access tracks, hardstand areas and other associated on-site infrastructure.
- An 8 km overhead 132 kV transmission line from the on-site substation to the existing Cataby substation, located on the western side of Brand Highway.

The Shire of Dandaragan granted amendments to the Planning Approval, including extensions to substantial commencement timeframes and incorporating changes to the wind farm design.

The Waddi Wind and Solar Farm proposal was referred to the (then) Commonwealth DEE in December 2018. DEE determined on 27 February 2019 that the Proposed Action was “Not a Controlled Action”.

A clearing permit application was submitted to the Western Australian Department of Water and Environmental Regulation (DWER) and a clearing permit (CPS 8449/1) was granted in September 2019 for the Waddi Wind Farm to clear up to 1.4 ha of native vegetation during a period of five years.

To enable construction and operation of the overhead 132 kV transmission line over Crown land reserves (R 27216 and R 41986), a licence under Section 91 of the *Land Administration Act 1997* was sought from the Department of Planning, Lands and Heritage (DPLH). The licence was granted on 8 April 2018 but has since expired.

The Waddi Wind Farm was ultimately not progressed at this time due to a variety of factors, including identification of offtake agreements for the supply of electricity, ongoing engagement with Western Power around the grid connection processes and progression of other renewable energy projects by the proponent.

3.1.3 Current EPBC Act referral (EPBC 2023/09639)

The current EPBC Act referral for Waddi Wind Farm was submitted to DCCEEW in August 2023 to replace the proposal’s previous “Not a Controlled Action” decision (EPBC 2018/8352). A new clearing permit was also submitted to DWER in November 2023, with the previously approved clearing permit (CPS 8449/1) subsequently surrendered.

Larger turbines have been proposed as part of the Proposed Action relevant to the previous EPBC Act referrals to take advantage of technological advancements in wind generation infrastructure. The Proponent has also reduced the total number of wind turbines proposed as part of the Waddi Wind Farm by 39 (to 18 wind turbines in total) while producing the same energy output.

Following the current EPBC Act referral in 2023, the Proponent has proposed to raise ground clearance to lowest turbine tip to an approximate height of 44 m, to further reduce the low potential collision risk with Carnaby’s Black Cockatoos. This decision was based on the observed site utilisation and flight heights of Carnaby’s Black Cockatoo within and proximate to the Project Area undertaken between the latest EPBC referral in 2023 and the lodgement of this Preliminary Documentation (BCE 2025).

The key design changes to the Proposed Action’s physical, construction and operational components are summarised in Table 3.

REPORT

Table 3: Key design changes to the Proposed Action's physical, construction and operational components

Project component	2011 EPBC Act referral (EPBC 2011/6006) ⁵	2018 EPBC Act referral (EPBC 2018/8352)	Change (2011 to 2018)	2023 EPBC Act referral (EPBC 2023/09639)	Change (2018 to 2023)	2025 Preliminary Documentation (EPBC 2023/09639)	Change (2023 to 2025)	Total change (2011 to 2025)
Physical components								
Project area	10,400 ha	10,400 ha	No change	10,491 ha	Increase by 91 ha to include the transmission line alignment	10,494 ha	No change	Increase by 94 ha to include the transmission line alignment
Construction components								
Native vegetation clearing	1.07 ha	1.4 ha	Increase by 0.33 ha	Up to 5.5 ha	Increase by 4.1 ha	Up to 5.5 ha	No change	Increase by 4.4 ha
Loss of potential Carnaby's cockatoo foraging habitat	1.07 ha of native vegetation	1.4 ha of native foraging habitat	Increase by 0.33 ha	Up to 5.3 ha of native foraging habitat and up to 21 pine trees and 11 planted trees (non-native eucalypts)	Increase by 3.9 ha of native foraging habitat and up to 21 pine trees and 11 planted trees (non-native eucalypts)	Up to 5.33 ha of native foraging habitat and up to 21 pine trees and 11 planted trees (non-native eucalypts)	Increase by 0.03 ha	Increase by 4.26 ha of native foraging habitat
Loss of potential Carnaby's breeding habitat	0	0	No change	Three marri trees	Increase by three marri trees	Three marri trees	No change	Increase by three marri trees
Operational components								
Indicative wind farm capacity	-	108 MW	-	108 MW	No change	108 MW	No change	No change
Maximum number of wind turbines	Up to 57	Up to 57	No change	Up to 18	Reduction of 39 turbines	Up to 18	No change	Reduction of 39 turbines
Turbine tip height	165 m	180 m	Increase by 15 m	180 m	No change	Up to 220 m (anticipated to be 206 m) ⁶	Increase by 40 m	Increase by 55 m

⁵ Only the Waddi Wind Farm component of the Dandaragan Wind Farms proposal is presented in Table 2.

⁶ The Proponent has recently sought an amendment to its Development Approval to increase the height of the wind turbines to up to a maximum of 220 m. Following further design development in response to wind loadings and advice from the turbine manufacturer the final height of the turbines is expected to be approximately 206 m. This height has been used for assessment purposes as part of this Preliminary Documentation.

REPORT

Project component	2011 EPBC Act referral (EPBC 2011/6006) ⁵	2018 EPBC Act referral (EPBC 2018/8352)	Change (2011 to 2018)	2023 EPBC Act referral (EPBC 2023/09639)	Change (2018 to 2023)	2025 Preliminary Documentation (EPBC 2023/09639)	Change (2023 to 2025)	Total change (2011 to 2025)
Ground clearance to lowest turbine tip	0–40 m	0–40 m	No change	0–18 m	Reduction of 22 m	Up to 58 m (anticipated to be 44 m)	Increase by 40 m	Increase by 18 m
Rotor Swept Area (RSA)	40–165 m	40–180 m	Increase by 15 m	18–180 m	Increase by 22 m	Up to 58–220 m (anticipated to be 44–162 m)	No change	Increase by 37 m
RSA per turbine	1.2 ha	1.5 ha	Increase by 0.3 ha	2.1 ha	Increase by 0.6 ha	2.1 ha	No change	Increase by 0.9 ha
RSA for turbine field	69.9 ha	87.7 ha	Increase by 17.8 ha	37.1 ha	Reduction of 50.6 ha	37.1 ha	No change	Reduction of 32.8 ha

A summary of the dimensions and sizing of wind turbines proposed to be used for the Proposed Action is provided in Table 4.

Table 4: Wind turbine summary

Turbine component	Anticipated dimensions	Maximum dimensions
Hub height	125 m	139 m
Blade length	81 m	81 m
Ground clearance	44 m	58 m
Rotor Swept Area (RSA)	2.1 ha	2.1 ha

3.2 Impact Avoidance

The Proponent's development process for the Waddi Wind Farm has been informed at all stages by implementation of a *mitigation hierarchy* framework. *Mitigation hierarchy* frameworks are an international best practice approach for addressing biodiversity risks and opportunities by prioritising actions to avoid environmental harm before sequentially considering opportunities to minimise, restore/remediate, then offset residual impacts. Although a mitigation hierarchy framework is not directly referenced in the EPBC Act or published Guidance documents, the approach is recognised by DCCEEW (2024q) as a useful tool to limit the damage an action will have on the environment.

The Proponent seeks to prioritise avoidance of impacts at all stages of project development, from prospecting through to finalisation, through adoption of a 'gated' development progress (Figure 3).

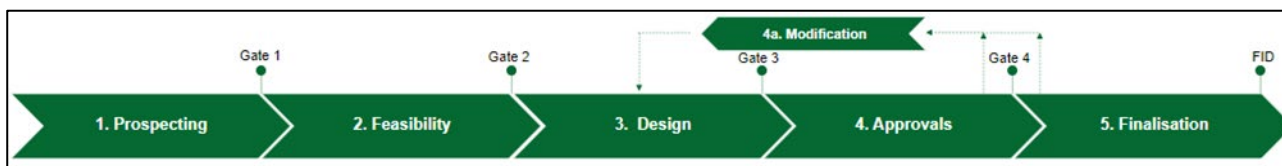


Figure 3: Tilt Renewables' gated development process

The gated development process ensures projects being considered and investigated by the Proponent are subject to a critical analysis of impact avoidance at all key stages, prior to the decision to engage in further investment. A summary of impact avoidance as it relates to each stage of the Waddi Wind Farm is summarised in the subsections below.

3.2.1 Prospecting

3.2.1.1 Need for Renewable Energy

The need for development of new renewable energy facilities in Australia is well documented. The country's coal-fired power assets are rapidly approaching retirement (AEMO 2024), with all State-owned coal-fired power stations in Western Australia due to close by 2030 (Bowen and Whitby 2024). At the same time, demand for renewable energy is growing as households and industry move towards electrification.

Australia is a signatory to the Paris Agreement which seeks to strengthen the global response to the threat of climate change by holding the increase in the global average temperature to well below 2°C above pre-industrial levels. Under the Paris Agreement, Australia has committed to Nationally Determined Contributions which are reflected in the legislated *Climate Change Act 2022* targets to:

- Reduce Australia's net greenhouse gas emissions to 43% below 2005 levels by 2030; and
- Reduce Australia's net greenhouse gas emissions to zero by 2050.

The DCCEEW Annual Climate Change Statement 2024 (DCCEEW 2024s) (ACCS) identifies the electricity sector as the single largest emissions source in the Australian economy, representing 34.6% of total emissions. The ACCS highlights that decarbonising the electricity sector will be vital to meeting Australia's emissions reduction targets, with decarbonisation of the sector needing to accelerate over the next five years to 2030. With the average lead-time for development of new onshore wind energy projects in Australia approaching 4.5 years (Clapin and Longden 2024), there is no feasible 'do nothing' scenario. Failure to expedite decarbonisation of the electricity sector through the development of late-stage renewable energy

projects such as the Proposed Action will result in Australia failing to achieve its greenhouse gas emissions targets under the *Climate Change Act 2022* as well as the country's international obligations under the Paris Agreement.

3.2.1.2 Site Selection

Site selection is a critical element of the prospecting phase. The location of renewable energy infrastructure requires a detailed consideration of constraints including available area, land tenure, topography, environmental values, wind resources, proximity to transmission infrastructure, available network capacity, adjacent land uses, visual amenity, noise, and cultural heritage, amongst others. At the prospecting phase, the Proponent seeks to identify new greenfield projects and complete an initial assessment of each opportunity. Prospecting typically occurs in two main ways:

- *Site origination*: assessment of previously unidentified sites with potential suitability for development as new renewable energy facilities.
- *Site acquisition*: acquisition of existing renewable energy projects under development by others. The Waddi Wind Farm was identified via this acquisition pathway.

All prospective wind farm sites, regardless of their acquisition method, are subjected to an initial level of desktop biodiversity constraints analysis, often supported by high level field surveys, to identify potentially significant environmental risks and implement impact avoidance at the earliest opportunity. This multi-criteria analysis effectively screens development opportunities that may represent development with unacceptable environmental or social impacts. For the Waddi Wind Farm, key considerations resulting in further development of the site included:

- The ability to site the turbines and ancillary wind farm infrastructure (e.g. access tracks) in cleared agricultural land away from key potential flora and fauna habitats.
- The ability to utilise existing access tracks to facilitate development of the transmission line, thereby minimising vegetation clearance.
- Proximity of suitable network capacity and viable connection points into Western Power's existing SWIS transmission network, avoiding the need for extensive transmission line infrastructure and the associated environmental and social impacts.
- The ability to limit physical disturbance to Aboriginal cultural heritage places listed under the Western Australian *Aboriginal Heritage Act 1972*.
- The comparatively small number of proximate dwellings and sensitive land uses in the locality (as compared to other development sites).
- The availability of a suitable oversize overmass (OSOM) route from Henderson (AMC) for large wind turbine components, avoiding the need for additional clearing of vegetation and key potential flora and fauna habitats to facilitate transportation.
- The excellent wind resource, enabling efficiencies in renewable energy generation and emissions reductions from a reduced level of infrastructure.

3.2.2 Feasibility and Design

3.2.2.1 Wind Prospect

At the time of acquisition by the Proponent, a significant body of feasibility and design work had already been completed by the previous project developer, Wind Prospect, including:

- Preparation of the following environmental assessments:
 - Avifauna Assessment Proposed Wind Farm Development Dandaragan Shire (RPS 2010a).
 - Fauna Assessment, Waddi Wind Farm (RPS 2010b).
 - Targeted Level 1 Vegetation and Flora Assessment Waddi (Outback Ecology 2010).
 - Waddi Wind Farm Spring Flora and Vegetation Survey and Black Cockatoo Habitat Survey (Outback Ecology 2014).

- Fauna Assessment, Waddi Wind Farm (RPS 2014).
- Waddi Wind Farm proposed action – Cataby Supplementary Flora, Vegetation and Fauna Survey (Ecologia Environment 2016).
- Development of an indicative 57 turbine project and transmission line layout, informed by the environmental assessments detailed above, together with an analysis of other relevant constraints such as turbine availability, wind resource and land tenure.

These investigations, which also supported the development and regulatory approval of the neighbouring Yandin Wind Farm, provided the Proponent with confidence that environmental and ecological setting of the Waddi Wind Farm was appropriate for a renewable energy facility with consideration to the mitigation and avoidance measures proposed as part of the investigations.

3.2.2.2 Tilt Renewables

Following acquisition of the Waddi Wind Farm, the Proponent sought to examine opportunities for further impact avoidance through additional feasibility assessments and modification to the design. Environmental investigations undertaken during the feasibility and design phases included:

- Black-Cockatoo habitat assessment for the Waddi Wind Farm transmission line alignment and the nominated areas in the adjacent farmland (Terrestrial Ecosystems 2022).
- Reconnaissance flora and vegetation assessment, Waddi Wind Farm (RPS 2023).

As a result of the further detailed environmental investigations completed as part of the Proposed Action's ongoing design, the following sections present an overview of specific design related outcomes that demonstrate the avoidance and minimisation of environmental impacts.

3.2.2.2.1 Avian impacts

Following completion of the additional investigations and advancement of wind turbine technology across the development of the Proposed Action, the number of wind turbines proposed was reduced from 57 to 18, which effectively minimises the potential avian turbine collision and barotrauma impacts. Whilst the change in turbine technology has resulted in an increase in RSA for the individual turbines, a net reduction of 50.6 ha (or 58%) in the combined RSA for the Proposed Action has been achieved when compared to the previous EPBC Act referral (EPBC 2018/8352), reducing the overall collision/barotrauma potential of the Proposed Action.

The length and width of the wind farm turbine field has remained largely unchanged, except for the removal of turbines from Lot 3805 on Deposited Plan 209083 to avoid potential Carnaby's cockatoo foraging and potential roosting habitat, as well as the need for a second crossing of Mullering Brook. However due to the reduction in turbine numbers the distances between individual turbines have increased. This has provided improved permeability of ridge line aerial environments in comparison to the 2011 and 2018 proposals. This increase in permeability has further minimised risks to avian species with regard to turbine collision and barotrauma impacts.

3.2.2.2.2 Climate and sustainability

Changes in technology since the Waddi Wind Farm was first proposed in 2011 mean that the same benefits of the Proposed Action in terms of electricity outputs and emissions reductions can be achieved with fewer turbines, minimising the overall use of resources required to achieve the same power output. The average energy payback time, or amount of time the turbines must operate in order produce an equivalent amount of energy required to build, operate and decommission them, is approximately 6.5 months (Vestas 2023).

3.2.2.2.3 Vegetation and habitat clearance

A key consideration in the post-acquisition feasibility phase was to identify opportunities to avoid clearance of the TEC and potential habitat for listed threatened species associated with construction of the transmission line. Following engagement with the Yued Aboriginal Corporation, the Proponent also sought to eliminate the need for ground disturbing works within the Mullering Brook Registered Cultural Heritage Place (ID 4640). To support analysis of these opportunities, a Constructability, Operability and Maintainability

Review was undertaken in conjunction with Western Power to assess the feasibility of the connection arrangement approved as part of EPBC Referral 2018/8352. That review identified that:

- The development footprint proposed in EPBC Referral 2018/8352 would be unlikely to meet Western Power's current (updated) construction, maintenance and operability requirements for new transmission line infrastructure.
- Construction of the transmission line in the approved 2018 location would require significant line protection upgrades, including upgrades at Pinjar substation, Regans Ford substation and Cataby substation on a total of five-line circuits. The proposed line upgrades would require an outage of four weeks per line (i.e. 20 weeks in total), which was not considered feasible from a network operability perspective.
- The approved 2018 alignment would also require the transmission line to run parallel to an existing 66 kV distribution line for part of its alignment. Western Power identified that this would prevent maintenance on the distribution line and would not be an acceptable solution to the network operator.

Due to these limitations identified following the determination of the EPBC Referral 2018/8352, feasible alternatives for the transmission line required investigation. The area between the proposed Waddi Wind Farm and Western Power's existing SWIS transmission network is highly constrained due to:

- The presence of extensive tracts of native vegetation comprising Banksia Woodlands of the Swan Coastal Plain TEC as well as potential habitat for listed threatened species (e.g. Carnaby's cockatoo).
- Intervening and potentially incompatible land uses including the Tronox Cooljarloo Mine and Billineue Aboriginal Community.
- Types and availability of land tenure including private freehold land, State and Council (Shire) administered road reserves, Crown land and the presence of land encumbrances, including extensive areas of Mining Leases.
- The location of other utilities, including the existing Western Power 66 kV distribution line running parallel to parts of the 2018 proposed alignment.
- Site topography and the presence of watercourses, including Mullering and Minyulo Brooks.
- Registered Aboriginal Heritage sites including Mullering Brook (ID 4640), Muralang Pool Camp (ID 4642) Minyulo Brook (Bilya) (ID 28326) and Wongonderrah Camp (ID 4641).
- The presence and location of residential dwellings.

Following analysis of these constraints and advice from Western Power as to available connection points, three potential alternative transmission line alignments were considered in detail, with these connection options illustrated in Figure 4.

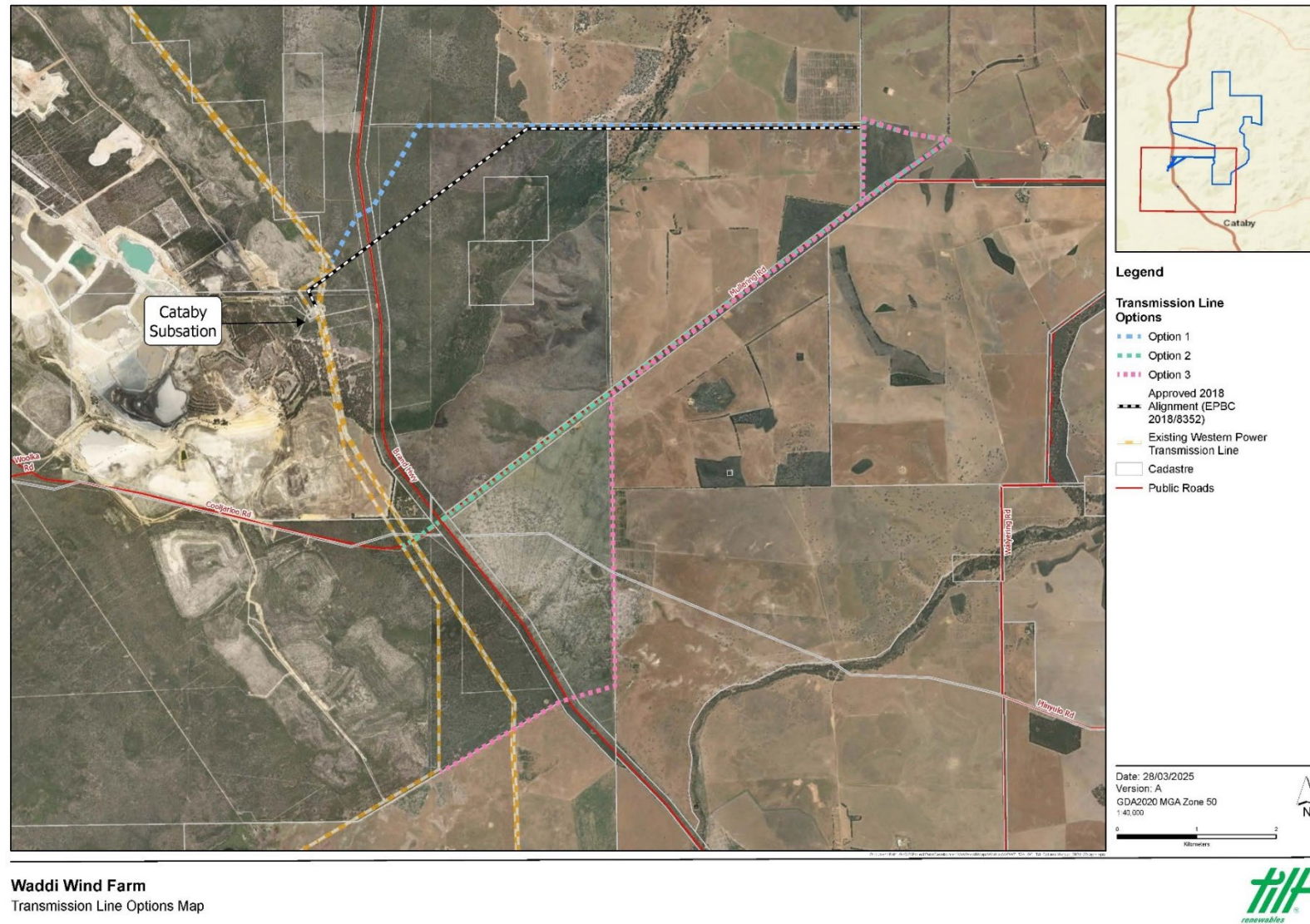


Figure 4: Alternative transmission line alignments

Option 1 broadly follows the transmission line alignment now proposed as part of the Proposed Action. This option was ultimately selected for further development due to:

- The ability to utilise primarily cleared agricultural land along the boundary and existing fence line of Lot 105 on Deposited Plan 59027, thereby minimising vegetation clearance and associated impacts to threatened species and TECs, as well as reducing disruption to the existing agricultural land use.
- The ability to maximise use of existing cleared access tracks through the remaining lots east and west of the Brand Highway, thereby avoiding the more extensive vegetation clearance that would be required to develop a “greenfield” transmission line through these areas.
- The ability to site all transmission poles and associated construction/maintenance accessways outside of the Mullering Brook Registered Cultural Heritage Place (ID 4640) thereby avoiding the need for ground disturbing works within the cultural heritage site.
- The alignment being the shortest of the routes identified, enabling efficiencies in resource use and embodied project carbon, as well as limiting the proliferation of transmission infrastructure in rural communities.
- The ability to locate all transmission pole infrastructure outside the Brand Highway road reserve, thereby:
 - Reducing health and safety concerns associated with the proliferation of built infrastructure along critical freight routes as identified to be a key issue for Main Roads Western Australia; and
 - Minimising the potential for vehicle collisions to result in damage to infrastructure and associated disruption to reliability of electricity supply into the SWIS.

Option 2 would have transited south or east through cleared agricultural land, before following Mullering Road (either within the road reserve or adjacent properties) to the intersection with the Brand Highway. From there, the transmission line would have crossed the Brand Highway and followed Cooljarloo Road through to the proposed SWIS connection point.

Option 3 would have followed the alignment of Option 2 through to the boundary of Lot 200 on Plan 73034 and Lot 3901 on Plan 209568. From there it would have deviated south through cleared agricultural land or sought to utilise an existing cleared access track through Lot 3901 on Plan 209568. The alignment then would have crossed the Brand Highway through or south of Lot 3901 on Plan 209568 before connecting back into the SWIS.

Factors contributing to the decision not to proceed further with Options 2 or 3 included:

- The potential need for extensive vegetation clearance and associated impacts to threatened species and TECs along Mullering Road and Crown reserves (particularly for Option 2).
- Potential destruction of one of the four known populations of *Drosera macropetala*, a DBCA Priority 1 species, last recorded in 1904 before its rediscovery in Mullering Road in 2021. All four known populations are within or adjacent to Mullering Road.
- Impediments to securing landholder agreements including the existence of extensive Mining Leases over all lands west of the Brand Highway and south of the Option 1 location. The Proponent does not hold compulsory acquisition powers.
- Proximity to the Billinue Aboriginal Community located south of the Tronox Cooljarloo Mine, close to the Mullering Road / Cooljarloo Road, Brand Highway intersections (particularly for Option 2).
- Difficulties managing structural loads in order to span the Brand Highway at the proposed Option 2 and Option 3 locations without locating transmission poles within the road reserve.
 - Locating transmission poles within the Brand Highway was considered but not preferred due to potential health and safety concerns associated with the proliferation of built infrastructure along critical freight routes, as well as disruption to the reliability of electricity supply in the event of vehicle collisions.
- Likely need for structural network upgrades.
- Difficulties in complying with Western Power’s operational requirements.

Once Option 1 was identified as the preferred alignment, the Proponent sought to further avoid impacts to vegetation forming threatened species and TECs throughout the design phase. Measures ultimately adopted included:

- Increasing the transmission line height to an average pole height of approximately 30 m to increase vertical clearance between the underlying vegetation and electrical conductors. This change enables Western Power's operational maintenance requirements (Section 131.3.2.2) to be met while minimising vegetation trimming required over the life of the asset.
- Increasing the span between each transmission pole to between 140 m to 350 m (depending on topography). This change reduces the overall number of poles required and the amount of corresponding vegetation clearance needed to provide for pole foundations.
- Reducing the clearance pad size required for pole foundations and operational access. Initial engagement with Western Power highlighted a standard Western Power maintenance requirement for a 40 m cleared easement along the length of the transmission corridor. Through ongoing negotiations with Western Power, this requirement was reduced, with an approach agreed to clear only access tracks and a 15 m operational access pad around each of the pole foundations.

Additional options to further avoid impacts associated with the transmission line were considered but ultimately not proceeded with. These included:

- The use of alternative pole types such as lattice steel towers. It was determined that these would require a cleared access pad of 20 m around each side of the tower foundations, greater than that required for steel poles, increasing likely vegetation removal requirements and associated impacts to TECs and threatened species.
- Placing the transmission line underground. Placing the transmission line underground was considered, however preliminary geospatial estimates indicated this would require clearance of approximately 9.34 ha of native vegetation (subject to final design) compared to 5.5 ha under the current proposal. Future maintenance and repair requirements could necessitate additional clearing when compared to the overhead option. Undergrounding the transmission line would also require ground disturbing works within Registered Cultural Heritage Place (ID: #4640) contrary to the outcome sought by the Yued Aboriginal Corporation.

3.2.3 Approvals

Implementation of the mitigation hierarchy and prioritisation of actions to avoid environmental harm have continued into the approvals phase. Since referring the Proposed Action to DCCEEW in August 2023, the Proponent has undertaken the following additional environmental investigations to help inform an improved understanding of the risk of impacts to MNES listed threatened species:

- Carnaby's Black-Cockatoo and Fork-tailed Swift utilisation survey (BCE 2025; Appendix C)
- Targeted star sun-orchid and sandplain duck orchid searches (RPS 2025; Appendix E)

As a result of those investigations and ongoing engagement with other regulatory stakeholders, the Proponent has made two key changes to the Proposed Action to further avoid potential impacts to MNES. These changes are:

1. Raising the ground clearance to the lowest turbine tip to approximately 44 m (Table 4). This decision was informed by the observed site utilisation and flight heights of Carnaby's cockatoo within and proximate to the Project Area between EPBC Act referral and lodgement of this Preliminary Documentation (BCE 2025). Further detail is outlined in Section 5.3.
2. Relocating the proposed access track and underground cabling that intersects Waddi Road to avoid direct impacts to up to 10 star sun-orchid individuals possibly located within the previous Native Vegetation Clearing Area (accounting for Global Positioning System (GPS) accuracy levels) (RPS 2025). Further detail is outlined in Section 5.4.2.

3.2.4 Finalisation

Finalisation is the last step in the development process before a project moves into construction. Opportunities for implementation of the mitigation hierarchy in this phase are reduced as compared to earlier

stages of development; however, finalisation is critical to ensure commitments to manage and control potential impacts (and to offset any significant residual impacts) are effectively implemented through:

- Development and approval of any required management plans.
- Ensuring all required pre-construction management measures and development controls are in place, prior to the commencement of works.
- Establishing clear roles and responsibilities, as well as effective communication and reporting protocols.
- Establishing and legally protecting proposed offset sites.

The Proponent works closely with its principal contractors and other stakeholders to continually explore opportunities to avoid residual impacts in the finalisation stage. By way of example, the recent utilisation of innovative construction methodologies and close engagement with construction contractors at the Proponent's Rye Park Wind Farm (completed in 2024) allowed the Proponent to achieve an overall reduction in impacts to all relevant vegetation types and species habitats from the impacts anticipated at the approval stage. This included:

- A 17% reduction in clearance of Superb Parrot (EPBC Act listing status: Vulnerable) habitat; and
- A 15% reduction in clearance of Golden Sun Moth (EPBC Act listing status: Vulnerable) habitat.

The Proponent is committed to continuing this approach at the Waddi Wind Farm as part of ongoing commitment to implementation of the mitigation hierarchy and adherence to corporate sustainable development goals.

3.3 Other post-referral amendments

In addition to the avoidance-led changes outlined in section 3.2.3, since the current EPBC Act referral (EPBC 2023/09639) was lodged in August 2023, the following changes have been made to the Proposed Action:

- A solar farm originally proposed within the boundary of the Project Area has been removed from the scope of the action
- A wind farm viewing platform formerly proposed adjacent to Mullering Road has been removed from the scope of the action

These post-referral amendments are not anticipated to materially alter the environmental impacts of the Proposed Action.

4 LOCAL AND REGIONAL CONTEXT

4.1 Reservations, land use and ownership

Land within and surrounding the Project Area is comprised primarily of privately owned agricultural land used for grazing (sheep and some cattle) and dryland cropping. These agricultural land uses are long established, and past land management practices have resulted in most of these properties being cleared of any significant native vegetation. The existing agricultural land uses will continue alongside the Proposed Action during operation.

To the west of Brand Highway, the Project Area intersects (Appendix Q):

- A Department of Biodiversity, Conservation and Attractions (DBCA) managed Badgingarra Conservation Park (Lot 4134 on Deposited Plan 240347; Crown reserve 41986), which is reserved for Public Purposes: Camping and Conservation of Flora; and
- An active Mining Lease (M 70/1398) for the Cooljarloo Mine held by Tronox. Exploration licences (E 70/5297, E 70/5636, E 70/6501 and E 70/6504) have also been granted by the Department of Mines, Industry Regulation and Safety over portions of the Project Area to the east of Brand Highway.

Remnant vegetation is present throughout the Project Area within patches and low-lying areas including valleys, creek lines, and along roadsides. The remnant vegetation patches generally consist of native grasses, remnant trees, heath woodlands and shrubland. The Proposed Action has been designed to ensure infrastructure avoids remnant vegetation wherever possible.

Land reserved for conservation purposes is located within and immediately adjacent to the Project Area as follows (Appendix Q):

- To the west of Brand Highway (DBCA managed Badgingarra Conservation Park (Lot 4134 on Deposited Plan 240347; Crown reserve 41986))
- Immediately adjacent to the Project Area's south-east boundary (Minyulo Nature Reserve);
- Approximately 2.5 km north of the Project Area's western boundary (Badgingarra National Park); and
- To the east of the Brand Highway, within Lot 3901 on Deposited Plan 209568 (Crown Reserve 27216).

The Project Area can be accessed from the Brand Highway, a north to south primary distributor road that is generally aligned west of the Project Area. The transmission line can be reached via unsealed tracks from the Brand Highway and Cooljarloo Road, whilst the wind farm can be reached via local roads (Mullering Road and Waddi Road) and unsealed tracks from the Brand Highway.

4.1.1 Project Area

The details of the land parcels that comprise the Project Area are provided in Table 5. Most of the lots intersecting the Project Area are freehold land under private ownership, with minor extents of public land comprised of lots and road reserves managed by State and Local government.

Table 5: Land parcels that comprise the Project Area

Lot and road reserve details	Certificate of Title (volume/folio)	Current Ownership
Lots		
Lot 2 on Deposited Plan 8424	1747/835	Private ownership
Lot 3 on Deposited Plan 8424	1604/69	Private ownership
Lot 2 on Deposited Plan 408189	2906/375	Electricity Networks Corporation (Western Power)
Lot 3 on Deposited Plan 408189	2906/376	Tronox Management Pty Ltd (subject to Mining Lease M70/1398)
Lot 101 on Diagram 72336	1780/891	Private ownership
Lot 105 on Deposited Plan 59027	2685/985	Private ownership
Lot 3846 on Deposited Plan 209083	1604/70	Private ownership

Lot and road reserve details	Certificate of Title (volume/folio)	Current Ownership
Lot 3805 on Deposited Plan 209083	1888/114	Private ownership
Lot 3897 on Deposited Plan 209569	1834/391	Private ownership
Lot 3899 on Deposited Plan 209567	1780/892	Private ownership
Lot 3903 on Deposited Plan 209569	1859/822	Private ownership
Lot 3901 on Deposited Plan 209568	3141/872	Crown reserve (administered by the Department of Planning, Lands and Heritage, vested in the Shire of Dandaragan)
Lot 4134 on Deposited Plan 240347	3089/642	Crown reserve (administered by the Department of Biodiversity, Conservation and Attractions, vested in Conservation and Parks Commission)
Road reserve		
P Road (Land ID 3182207) – Waddi Road	N/A	Road reserve (administered by the Shire of Dandaragan)
P Road (Land ID 3608625) – Mullering Road	N/A	Road reserve (administered by the Shire of Dandaragan)
P Road (Land ID 3608624) – Brand Highway	N/A	Road reserve (administered by Main Roads Western Australia)

A map showing all lots, road reserves and Crown land parcels for the Proposed Action, including proposed wind farm and transmission line tenure arrangements, is presented in Appendix Q.

4.2 Proximate wind farms

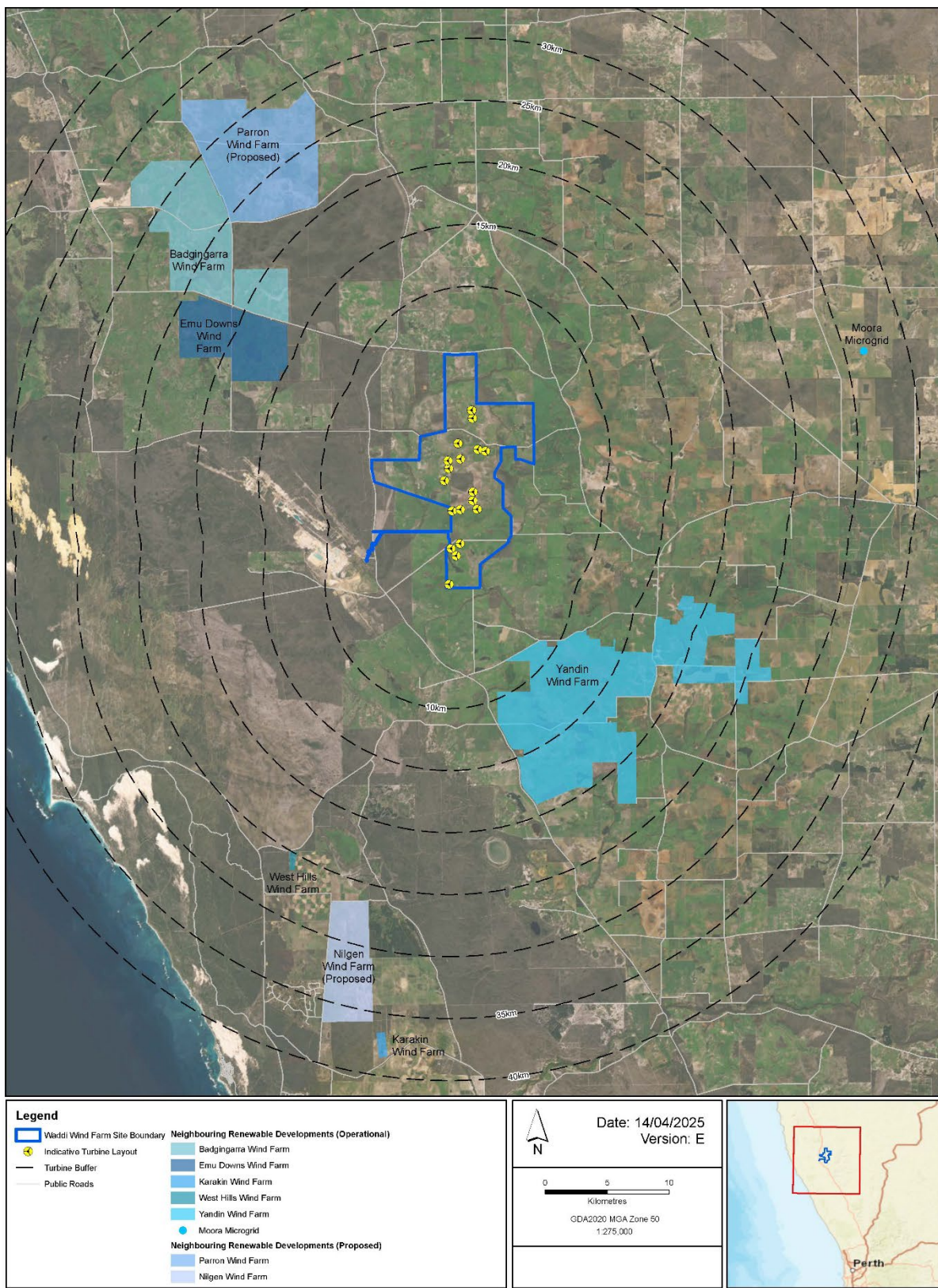
The Project Area is proximate to six operating wind farms:

- Large-scale wind farms:
 - **Badgingarra Wind Farm:** APA's Badgingarra Wind Farm is situated approximately 20 to 35 km north-west of the Waddi Wind Farm and consists of 37 Siemens 3.6-MW wind turbine generators installed with a hub height of 85 m and tip height of 150 m (APA 2024a). The minimum lower tip swing is approximately 20 m above natural ground level (APA n.d.)
 - **Emu Downs Wind Farm:** APA's Emu Downs Wind Farm is situated immediately to the south of the Badgingarra Wind Farm and is approximately 15 to 20 km north-west of the Waddi Wind Farm. The Emu Downs Wind Farm consists of 48 × 1.65-MW wind turbine generators installed with a hub height of 68.5 m (APA 2024b). The minimum lower tip swing is approximately 27.5 m above natural ground level (APA 2024b). It was originally completed in 2006 and acquired by APA in 2011
 - **Yandin Wind Farm:** Alinta Energy's Yandin Wind Farm is situated approximately 10 to 25 km south-east of the Waddi Wind Farm and consists of 51 Vestas 4.2-MW wind turbine generators (Ratch and Alinta Energy 2024). The Yandin Wind Farm formed part of the Dandaragan Wind Farms proposal (EPBC 2011/6006; Section 3.1.2) along with the Waddi Wind Farm. The minimum lower tip swing is approximately 30 m above natural ground level (Ratch and Alinta Energy 2024)
- Small scale wind farms:
 - **Moora Microgrid:** Advanced Energy Resources' Moora Microgrid is situated approximately 35 km east of the Waddi Wind Farm and consists of five refurbished 0.5 MW wind turbine generators. The minimum lower tip swing of these turbines is unknown
 - **West Hills Wind Farm:** BlairFox's West Hills Wind Farm is situated approximately 35 km south-west of the Waddi Wind Farm and consists of ten 0.5 MW wind turbine generators. The minimum lower tip swing of these turbines is unknown
 - **Karakin Wind Farm:** BlairFox's Karakin Wind Farm is situated approximately 50 km south-west of the Waddi Wind Farm and consists of ten 0.5 MW wind turbine generators. The minimum lower tip swing of these turbines is unknown

The Project Area is proximate to two proposed wind farm:

- **Parron Wind Farm:** Zephyr Energy Pty Ltd's Parron Wind Farm is situated approximately 16 to 30 km north-west of the Waddi Wind Farm (Zephyr Energy Pty Ltd 2024). The Parron Wind Farm formed part of the Badgingarra Wind Farm proposal (EPBC 2007/3529), which has been delivered except for the portion relevant to the Parron Wind Farm's Project Area. The Parron Wind Farm is proposed to consist of 79 x 6.2-MW wind turbine generators installed with a hub height of 149 m and tip height of 230 m. The minimum lower tip swing is approximately 69.65 m above natural ground level. An EPBC Act referral (EPBC 2024/10062) was submitted in October 2024 and the Proposed Action is awaiting a delegate decision
- **Nilgen Wind Farm:** Pacific Hydro's Nilgen Wind Farm is situated approximately 40km south-west of the Waddi Wind Farm and is proposed to consist of 38 2.5 MW wind turbine generators. The minimum lower tip swing of these turbines is 42m. An EPBC Act referral (EPBC 2009/4694) was submitted in 2009 and the Proposed Action was determined not to be a controlled action. Construction has not commenced, and it is unclear whether the project is still being actively developed

The location of the proximate wind farms relative to the Project Area is identified in Figure 5.



Waddi Wind Farm

Neighbouring Renewable Energy Developments



Figure 5: Proximate Dandaragan wind farms

4.3 Flora

4.3.1 Environmental investigations

The flora values of the Project Area have been subject to extensive investigation through site-specific flora surveys conducted during the spring flowering seasons between 2008 and 2024. The site-specific flora surveys undertaken for the Waddi Wind Farm and key findings relative to flora listed as MNES under the EPBC Act are presented in Table 6. Combined survey boundaries are presented in Figure A.

Table 6: Site specific flora surveys undertaken for the Waddi Wind Farm and key findings relative to EPBC Act listed flora

Flora and vegetation survey	Flora investigation	Key findings with respect to EPBC Act listed flora
Targeted Level 1 Vegetation and Flora Assessment Waddi (Outback Ecology 2010; Appendix M)	- A Level 1 survey and targeted searches for Commonwealth EPBC Act and Western Australia state-listed conservation significant flora were conducted at a series of sampling points that were potential turbine sites, remnant vegetation patches and access tracks and potential cable routes within the Project Area. Survey boundaries are presented in Figure A. - Survey objectives included: - Undertaking a review of conservation significant flora species (Threatened and Priority species) known, or likely to occur within the Project Area. - Developing an inventory of flora species within the Project Area, including conservation significant flora. - Providing an initial assessment of the regional and local conservation values of the flora. - Surveys and targeted searches were undertaken over two field trips, between 12–15 November 2008 and 28–29 January 2009 (early to mid-summer). - Twenty-five relevés were described in remnant vegetation, 18 relevés on access track and underground transmission line routes, and 29 sampling points in pasture and remnant vegetation were visited.	168 taxa from 31 families were recorded, including two weed species and 166 native species. No Commonwealth EPBC Act listed Threatened flora species were recorded.
Waddi Wind Farm Spring Flora and Vegetation Survey and Black Cockatoo Habitat Survey (Outback Ecology 2014; Appendix J)	- A Level 1 survey and targeted subsampling for conservation significant flora were undertaken to update the 2010 study to include two substation options and the then proposed transmission line route. Survey boundaries are presented in Figure A. - The field survey was undertaken between 29 October and 1 November 2013 (spring). - Targeted flora searches were conducted for Commonwealth EPBC Act and state WC Act (repealed) listed flora to fulfil Condition 8 of a previous clearing permit (4608/2)	191 taxa from 38 families and 98 genera were recorded, including eight weed species and 183 native species. No Commonwealth EPBC Act listed Threatened flora species were recorded
Waddi Wind Farm proposed action – Cataby Supplementary Flora, Vegetation and Fauna Survey (Ecologia Environment 2016; Appendix I)	- Supplementary survey covering 23.4 ha to inform alteration(s) to the transmission line alignment and substation connection. Survey boundaries are presented in Figure A. - The field component of the survey was conducted on 6 October 2016 (spring) and included a targeted survey for Commonwealth EPBC Act and Western Australia state-listed conservation significant flora.	75 species were recorded during the 2016 survey, including 15 weed species and 60 native species. No Commonwealth EPBC Act listed Threatened flora species were recorded.
Reconnaissance flora and vegetation assessment, Waddi Wind Farm (RPS 2023; Appendix G)	- A reconnaissance survey was undertaken across two years (2021 and 2022): - Between 29 September and 7 October 2021 (spring), a 1,408-ha extent of land was target searched for Commonwealth EPBC Act and Western Australia state-listed conservation significant flora species - Between 7 September and 9 September 2022 (spring), an additional 37 ha extent of land was target searched for Commonwealth EPBC Act and Western Australia state-listed conservation significant flora species - Transects were walked through areas of intact native vegetation at 10–15 m spacings to identify Commonwealth EPBC Act and Western Australia state-listed conservation significant flora species - A comprehensive species list was compiled in the field and updated following field work with reference to pressed specimens and photographs. The species list was taxonomically checked using state herbarium data. - Survey boundaries are presented in Figure A.	294 species were recorded from 51 families during the 2021 and 2022 surveys, including 20 introduced (weed) species and 274 native species. Three Commonwealth EPBC Act listed Threatened flora were recorded: <i>Thelymitra stellata</i> (EPBC Act listing status: Endangered) <i>Anigozanthos viridis subsp. terraspectans</i> (EPBC Act listing status: Vulnerable) <i>Hakea megalosperma</i> (EPBC Act listing status: Vulnerable)
Targeted star sun-orchid and sandplain duck orchid searches (RPS 2025; Appendix E)	- A targeted orchid search was undertaken for <i>Thelymitra stellata</i> and <i>Paracaleana dixonii</i> individuals to confirm the presence of these species within and proximate to the native vegetation clearing area. Survey boundaries are presented in Figure A - The field survey was undertaken 21 to 24 October 2024 (i.e. known flowering time for both species). - The targeted searches involved systematic grid-based foot-traverses at 5 to 10 m spacings across the native vegetation clearing area and the nominal buffer areas.	- One species was recorded, with 25 <i>Thelymitra stellata</i> records containing 34 individuals One Commonwealth EPBC Act listed Threatened flora was recorded: <i>Thelymitra stellata</i> (EPBC Act listing status: Endangered)

4.3.2 Conservation significant flora records

Commonwealth EPBC Act listed conservation significant flora records identified across all flora surveys are summarised in the Table 7. The locations of the conservation significant flora records are shown in Figure B, Figure C, Figure D and Figure E.

Table 7: EPBC Act listed conservation significant flora species recorded by the flora and vegetation surveys

MNES	EPBC Act listing status	Survey	Number of individuals recorded	Figure reference
<i>Thelymitra stellata</i> (Star Sun-orchid)	Endangered	RPS 2025	34	Figure B and Figure C
		RPS 2023	37	
<i>Anigozanthos viridis</i> subsp. <i>terraspectans</i> (Dwarf Green Kangaroo Paw)	Vulnerable	RPS 2023	1	Figure B and Figure D
<i>Hakea megalosperma</i> (Lesueur Hakea)	Vulnerable	RPS 2023	4	Figure B and Figure E

Searches of DCCEEW's Protected Matters Search Tool database for MNES and the DBCA's Threatened and Priority Flora database within a 20 km and 25 km radius of a central point were undertaken as part of RPS (2023). The EPBC Act listed flora species records from the DBCA's Threatened and Priority Flora database are illustrated in Figure B.

A recent search of DCCEEW's Protected Matters Search Tool database for MNES was also undertaken in February 2025 within a 25 km radius of the Project Area to support the preparation of this Preliminary Documentation (DCCEEW 2025a; Appendix S). This identified an additional four flora species compared to the July 2023 Protected Matters Search Tool report used in the August 2023 EPBC Act referral:

- Wilson's wattle. The species was not identified in the July 2023 Protected Matters Search Tool report as the mapped extent of the species or species habitat known to occur within area was located approximately 22 km from the Project Area, and the July 2023 Protected Matters Search Tool report was based on a 20 km search radius.
- Dark-bract banksia. The species was not identified in the July 2023 Protected Matters Search Tool report as the mapped extent of the species or species habitat may occur within area was located approximately 25 km from the Project Area, and the July 2023 Protected Matters Search Tool report was based on a 20 km search radius.
- Midlands gum. The species was not identified in the July 2023 Protected Matters Search Tool report as the mapped extent of the species or species habitat likely to occur within area was located approximately 22 km from the Project Area, and the July 2023 Protected Matters Search Tool report was based on a 20 km search radius.
- Mount Lesueur mallee. The species was not identified in the July 2023 Protected Matters Search Tool report as the mapped extent of the species or species habitat likely to occur within area was located approximately 24 km from the Project Area, and the July 2023 Protected Matters Search Tool report was based on a 20 km search radius.

A high-level likelihood of occurrence assessment has been undertaken for the additional four flora species identified in Table 8.

The additional four flora species are unlikely to occur within the Project Area, therefore they are not addressed further in the Preliminary Documentation.

Table 8: Threatened flora species identified by February 2025 Protected Matters Search Tool report and likelihood of occurrence within the Project Area

MNES	EPBC Act listing status	Type of presence	Likelihood of occurrence within the Project Area
<i>Acacia wilsonii</i> (Wilson's wattle)	Endangered	Species or species habitat known to occur within area (In buffer area only)	Unlikely - This species is unlikely to occur within the Project Area as it was not detected within the Project Area in areas of suitable habitat, and the known subpopulations are located over 20 km north of the Project Area. - The Wilson's wattle is a low spreading wiry shrub, growing to 0.2-0.5 m high (Western Australian Herbarium 1998–). It is found in white/yellow sand and lateritic gravel and sandy clay over laterite, or grey sand in heath. This species appears to flower mainly from October to mid-November, but also in December and March (Threatened Species Scientific Committee (TSSC) 2018a). - The species is known to occur in five subpopulations which are located in road reserves, private property and a National Park (TSSC 2018a). Records from the subpopulations are located approximately 24 km to 80 km north of the Project Area (Western Australian Herbarium 1998–). All subpopulations of Wilson's wattle have been recorded in open heath, and three of the subpopulations occur in mallee woodland. - This species was previously identified within a NatureMap search area (40 km radius of a central point) (RPS 2023). However, there no records of the Wilson's wattle in the DBCA's Threatened and Priority Flora database results, nor was the species detected in the flora surveys undertaken from November 2008 to September 2022 (RPS 2023, Ecologia Environment 2016, Outback Ecology 2014 and Outback Ecology 2010). This species was listed as Endangered under the EPBC Act in 2018 and was listed as Endangered under the <i>Wildlife Conservation Act 1950</i> in 2004 (TSSC 2018a). - Proteaceous heath over laterite is present within the Project Area, which is suitable habitat for the Wilson's wattle. The flora surveys inspected areas of proteaceous heath over laterite during the flowering period of the Wilson's wattle, however the species has not been detected (RPS 2023, Ecologia Environment 2016, Outback Ecology 2014 and Outback Ecology 2010).
<i>Banksia fuscobractea</i> (dark-bract banksia)	Critically Endangered	Species or species habitat may occur within area (In buffer area only)	Unlikely - This species is unlikely to occur within the Project Area as it was not detected within the Project Area in areas of suitable habitat, and the known populations are located over 50 km south-east of the Project Area - The dark-bract banksia is an erect, prickly and non-lignotuberous shrub that grows approximately 1 m high (Western Australian Herbarium 1998–). It has yellow flowers from July to October and is found in lateritic gravel and grey sand over laterite. - The species is known to occur in two populations located in road reserves and private property, in the Shire of Dandaragan and the Shire of Victoria Plains (DEC 2008). The dark-bract banksia has a restricted distribution of approximately 0.26 km² east of Gillingarra, with the closest records collected approximately 55 km south-east of the Project Area (Western Australian Herbarium 1998–). Dark-bract banksia grows on grey sand over laterite in areas of low heath and appears to favour gravel ridges. - There are no records of the Dark-bract Banksia in the DBCA's Threatened and Priority Flora database results, nor was the species detected in the flora surveys undertaken from November 2008 to September 2022 (RPS 2023, Ecologia Environment 2016, Outback Ecology 2014 and Outback Ecology 2010). This species was listed as Critically Endangered under the EPBC Act in 2009 and listed as Critically Endangered under the <i>Wildlife Conservation Act 1950</i> in 2004 (DEC 2008, Department of the Environment, Water, Heritage and the Arts 2009). - Proteaceous heath over laterite is present within the Project Area, which is suitable habitat for the dark-bract banksia. The flora surveys inspected areas of proteaceous heath over laterite during the flowering period of the dark-bract banksia, however the species has not been detected (RPS 2023, Ecologia Environment 2016 and Outback Ecology 2014).
<i>Eucalyptus pruiniramis</i> (Midlands gum)	Endangered	Species or species habitat likely to occur within area (In buffer area only)	Unlikely - This species is unlikely to occur within the Project Area as it was not detected within the Project Area in areas of suitable habitat, and the known populations are located over 50 km north-east and south-east of the Project Area - The Midlands gum grows 2.5-7 m high and is characterised by a straggly tumbledown crown with rough and ribbony bark at base and smooth above (Western Australian Herbarium 1998–). It has white flowers in December and is found in skeletal soils over sandstone or laterite and rocky hillslopes. - The species is known to occur in nine populations between Mogumber and Arrino, north of Three Springs, which are in road verges, private property and a national park (Department of the Environment, Water, Heritage and the Arts 2008a). The closest records of Midlands gum collected are approximately 50 km north-east and 55 km south-east of the Project Area (Western Australian Herbarium 1998–). The Midlands gum is found in open, low mallee woodlands emerging from heath or scrub, in yellow sand or brown, sandy loam and lateritic gravel or quartz (Department of the Environment, Water, Heritage and the Arts 2008a). - This species was previously identified within a NatureMap search area (40 km radius of a central point) (RPS 2023). However, there no records of the Midlands gum in the DBCA's Threatened and Priority Flora database results, nor was the species detected in the flora surveys undertaken from November 2008 to September 2022 (RPS 2023, Ecologia Environment 2016, Outback Ecology 2014 and Outback Ecology 2010). This species was listed as Endangered under the EPBC Act in 2000 and listed as Endangered under the <i>Wildlife Conservation Act 1950</i> in 2000 (Department of the Environment, Water, Heritage and the Arts 2008a). - Proteaceous heath over laterite is present within the Project Area, which is suitable habitat for the Midlands gum. The flora surveys inspected areas of proteaceous heath over laterite during the flowering period of the Midlands gum, furthermore the species would have been visible if present as a tree or mallee. However, the species has not been detected (RPS 2023, Ecologia Environment 2016, Outback Ecology 2014 and Outback Ecology 2010).
<i>Eucalyptus suberea</i> (Mount Lesueur mallee)	Vulnerable	Species or species habitat likely to occur within area (In buffer area only)	Unlikely - This species is unlikely to occur within the Project Area as it was not detected within the Project Area in areas of suitable habitat, and the known populations are located over 30 km north-north-west of the Project Area - The Mount Lesueur mallee grows to 1-4 m high and has rough and flaky bark (Western Australian Herbarium 1998–). It has white flowers from November to December or January and is found in grey sand and near or on lateritic breakaways. - The species is known to occur in 18 populations from areas in Mt Leseur to Coomaloo Creek in the Midwest region, which are in conservation estates, private property and land reserved for educational purposes (Department of the Environment, Water, Heritage and the Arts 2008b). The closest records of Mount Lesueur mallee collected are approximately 30 km north-northwest of the Project Area (Western Australian Herbarium 1998–). The Mount Lesueur mallee is found in open mallee communities over dense low heath on or near breakaways and the edges of mesas (Department of the Environment, Water, Heritage and the Arts 2008b). - This species previously identified within a NatureMap search area (40 km radius of a central point) (RPS 2023) and a Department of Environment and Conservation declared rare and priority flora database search (Outback Ecology 2010). However, there no records of the Mount Lesueur mallee in the DBCA's Threatened and Priority Flora database results, nor was the species detected in the flora surveys undertaken from November 2008 to September 2022 (RPS 2023, Ecologia Environment 2016, Outback Ecology 2014 and Outback Ecology 2010). This species was listed as Vulnerable under the EPBC Act in 2000 and listed as Vulnerable under the <i>Wildlife Conservation Act 1950</i> in 2000 (Department of the Environment, Water, Heritage and the Arts 2008b). - Proteaceous heath over laterite is present within the Project Area, which is suitable habitat for the Mount Lesueur mallee. The flora surveys inspected areas of proteaceous heath over laterite during the flowering period of the Mount Lesueur mallee, furthermore the species would have been visible if present as a mallee.

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MNES	EPBC Act listing status	Type of presence	Likelihood of occurrence within the Project Area
			However, the species has not been detected (RPS 2023, Ecologia Environment 2016, Outback Ecology 2014 and Outback Ecology 2010).

4.3.2.1 Project Area context

All known records of Commonwealth EPBC Act listed Threatened flora species, dwarf green kangaroo paw and Leseur hakea, have been avoided during wind farm design (Figure B, Figure D and Figure E).

All known records of Commonwealth EPBC Act listed Threatened flora species, star sun-orchid, have been avoided during wind farm design and will be avoided through additional management and monitoring actions during pre-construction / construction and operation (Figure B and Figure C) (Table 23).

4.4 Vegetation

4.4.1 Regional vegetation

The Project Area almost entirely lies within the Lesueur Sandplain subregion of the Geraldton Sandplains bioregion of the Interim Biogeographical Regionalisation of Australia (IBRA) (DAWE 2023). A minor south-western portion of the Project Area is situated within the Perth subregion of the Swan Coastal Plain bioregion. The location of the Geraldton Sandplains bioregion and Swan Coastal Plain bioregion in relation to the Project Area is illustrated in Figure G and Figure I.

The landscape of the Lesueur Sandplain subregion is composed mainly of extensive, undulating, lateritic sandplain mantling Permian to Cretaceous strata (Desmond and Chant 2001). The Perth subregion is composed of colluvial and aeolian sands, alluvial river flats, and coastal limestone (Mitchell et al. 2001).

Agricultural activities occupy over 69% of the Lesueur Sandplain subregion (Desmond and Chant 2001), while major components of the Perth subregion's landscape are covered by mines, mining tenements, exploration leases and to a lesser extent grazing (Mitchell et al. 2001).

Approximately 53,156 ha of the Banksia woodlands of the Swan Coastal Plain TEC is reported within a 25 km search radius of a central point by the DBCA's Threatened and Priority ecological communities database (RPS 2023).

4.4.1.1 Vegetation associations

Almost 900 vegetation associations are mapped across Western Australia, derived from mapping by J. S. Beard that was carried out from 1964 to 1981 (Beard et al. 2013). Vegetation Associations are grouped into vegetation types based on physiognomy, floristics and, in some cases, ecological and regional attributes, with 50 major vegetation types identified in Western Australia (Beard et al. 2013). Vegetation associations are considered in the Preliminary Documentation to assess the impacts of clearing in the native vegetation clearing area within the context of the vegetation associations present within the Project Area and wider region.

The broad vegetation associations mapped within the Project Area (Shepherd et al. 2002 and Beard et al. 2013) are described as follows:

- Vegetation Association 1031 – Mosaic: Shrublands; hakea scrub-heath / Shrublands; dryandra heath
 - Vegetation Type 108 – Scrub-heath / heath
- Vegetation Association 1030 – Low woodland; *Banksia attenuata* and *Banksia menziesii*
 - Vegetation Type 9 – Low woodland or open low woodland: Other wattle (*Acacia* spp.), banksia (*Banksia* spp.), peppermint (*Agonis flexuosa*), cypress pine (*Callitris* spp.), casuarina (*Allocasuarina* spp.), York gum (*Eucalyptus loxophleba*)
- Vegetation Association 7 – Medium woodland; York gum (*Eucalyptus loxophleba*) and wandoo
 - Vegetation Type 4 – Woodland: Wheatbelt—York gum (*Eucalyptus loxophleba*), salmon gum (*E. salmonophloia*), etc. Goldfields—gimlet (*E. salubris*), redwood (*E. transcontinentalis*), etc. Riverine—rivergum (*E. camaldulensis*). Tropical—Darwin stringybark (*E. tetrodonta*) and woollybutt (*E. miniata*)

Vegetation Associations 7 and 1031 have 33.6% and 34.5% of their pre-European extent remaining within the Geraldton Sandplains IBRA bioregion and Vegetation Association 1030 has 63.8% of its pre-European extent remaining within the Swan Coastal Plain IBRA bioregion (Government of Western Australia 2019).

The Commonwealth's National Targets and Objectives for Biodiversity Conservation (Environment Australia 2001a) recognise that the retention of 30%, or more, of the pre-clearing extent of each ecological community is necessary if Australia's biological diversity is to be protected.

4.4.2 Environmental investigations

The vegetation values of the Project Area have been subject to extensive investigation by site specific vegetation surveys conducted during the spring flowering season between 2008 and 2022. The site-specific vegetation surveys undertaken for the Waddi Wind Farm and key findings relative to EPBC Act listed TECs are presented in Table 9. Combined survey boundaries are presented in Figure A.

Table 9: Site specific vegetation surveys undertaken for the Waddi Wind Farm and key findings relative to EPBC Act listed TECs

Flora and vegetation survey	Vegetation investigation	Key findings with respect to EPBC Act listed threatened ecological communities
Targeted Level 1 Vegetation and Flora Assessment Waddi (Outback Ecology 2010; Appendix M)	- A Level 1 survey and targeted searches for conservation significant flora were conducted at a series of sampling points that were potential turbine sites, remnant vegetation patches and access tracks and cable routes within the Project Area. Survey boundaries are presented in Figure A. - Survey objectives included: - Undertake a review of Commonwealth EPBC Act listed TECs known, or likely to occur within the Project Area. - Define, describe and map vegetation associations across the Project Area at selected remnant vegetation patches and along potential access tracks, cable routes and transmission lines. - Provide an initial assessment of the regional and local conservation value of the vegetation. - Identify potential environmental impacts resulting from development and identify alternative routes and development areas where possible to reduce impacts on native vegetation. - Survey and targeted searches were undertaken over two field trips, in November 2008 and January 2009 (late spring to mid-summer) - Twenty-five relevés were described in remnant vegetation, 18 relevés on access track and underground transmission line routes, and twenty-nine sampling points in pasture and remnant vegetation were visited.	- Thirteen vegetation types were described and were classified as either woodland, shrubland or heath communities. No Commonwealth EPBC Act listed TECs were identified. - Remnant vegetation was generally in good condition, with larger patches of heath in excellent condition.
Waddi Wind Farm Spring Flora and Vegetation Survey and Black Cockatoo Habitat Survey (Outback Ecology 2014; Appendix J)	- A Level 1 survey and targeted subsampling for conservation significant flora were undertaken to update the 2010 study to include two substation options and the proposed transmission line route to the Cataby substation, and the Cataby substation itself. Survey boundaries are presented in Figure A - The field survey was undertaken between 29 October and 1 November 2013 (spring) - Fifteen relevés were described in remnant vegetation.	- Eight vegetation types were defined including <i>Eucalyptus tottiana</i> woodland (two variants), Melaleuca Woodland, Myrtaceous Scrub, Banksia woodland (two variants) and one disturbed creek line. No Commonwealth EPBC Act listed TECs were identified.
Waddi Wind Farm proposed action – Cataby Supplementary Flora, Vegetation and Fauna Survey (Ecologia Environment 2016; Appendix I)	A supplementary survey covering 23.4 ha to inform alteration(s) to the transmission line alignment. The field component of the survey was conducted on 6 October 2016 (spring) and included quadrat based floristic survey and vegetation mapping. Survey boundaries are presented in Figure A.	- Five vegetation types were defined including Banksia Low woodland, <i>Corymbia</i> Mid Open Woodland and cleared farmland. 5.5 ha of Banksia woodland vegetation situated within the Swan Coastal Plain bioregion was considered to represent Commonwealth EPBC Act listed Banksia woodlands of the Swan Coastal Plain TEC due to its location and physical environmental setting. No other Commonwealth EPBC Act listed TECs were identified.
Reconnaissance flora and vegetation assessment, Waddi Wind Farm (RPS 2023; Appendix G)	- A Reconnaissance survey was undertaken across two years (2021 and 2022): - Between 29 September and 7 October 2021 (spring), a 1,408-ha extent of land was surveyed - Between 7 September and 9 September 2022 (spring), an additional 37 ha extent of land was surveyed - Vegetation composition and structure was assessed at 213 relevé sites, and mapping notes were made at a further 262 locations. Vegetation condition was assessed at a further 123 sites - Vegetation types were described and mapped through interpretation of aerial photography with reference to relevé descriptions and mapping notes taken while in the field. - Survey boundaries are presented in Figure A.	- Nine vegetation types were described. Four represented Proteaceous heath communities, three represented Banksia woodland vegetation, one represented degraded parts of the landscape and one represented a revegetated area. Approximately 12.7 ha of the overall surveyed Banksia Woodland vegetation situated within the Swan Coastal Plain bioregion was considered to represent the EPBC Act listed Banksia woodlands of the Swan Coastal Plain TEC due to its location and physical environmental setting. No other Commonwealth listed TECs were identified.

4.4.3 Conservation significant vegetation records

The Banksia Low Open Woodland vegetation within the portion of the Project Area that intersects the Perth subregion of the Swan Coastal Plain bioregion is considered to represent the EPBC Act listed Banksia woodlands of the Swan Coastal Plain TEC because it is situated within the Swan Coastal Plain IBRA bioregion (RPS 2023; Ecologia Environment 2016). Approximately 12.7 ha of Banksia woodlands of the Swan Coastal Plain TEC has been identified across the Project Area within the survey areas assessed by RPS (2023), Ecologia Environment (2016) and Outback Ecology (2014) (Figure I).

Location and physical environment are key diagnostic characteristics of the EPBC Act listed Banksia woodlands of the Swan Coastal Plain TEC. The Commonwealth's approved conservation advice (DEE 2016a) for the TEC identifies:

- Banksia woodlands of the Swan Coastal Plain TEC primarily occur in the Swan Coastal Plain IBRA bioregion.
- This covers the coastal plain from around Jurien Bay south, through Perth, to around Dunsborough. It also includes the Dandaragan Plateau subregion.
- Pockets of the Banksia woodlands ecological community also extend into the adjacent lower parts of the Darling and Whicher escarpments that lie within the Jarrah Forest IBRA bioregion to the immediate east and south of the Swan Coastal Plain IBRA bioregion.

There was 83 ha of Banksia Low Open Woodland vegetation surveyed for the Proposed Action, which was located within the Swan Coastal Plain IBRA bioregion (12.7 ha) and the Geraldton Sandplains IBRA bioregion (70.3 ha). As most of the Banksia Low Open Woodland vegetation within the Project Area does not occur within the Swan Coastal Plain IBRA bioregion (i.e. it is within the Geraldton Sandplains IBRA bioregion), it does not meet the location and physical environment description identified in the Commonwealth's approved conservation advice. Hence it is not considered to be representative of the EPBC Act listed Banksia woodlands of the Swan Coastal Plain TEC.

Searches of DCCEEW's Protected Matters Search Tool database for MNES and the DBCA's Threatened and Priority Ecological Communities database within a 20 km and 25 km radius of a central point were undertaken as part of RPS (2023). The EPBC Act listed TEC records, identified as Banksia woodlands of the Swan Coastal Plain ecological community (P3) by the DBCA's Threatened and Priority Ecological Communities database, are illustrated in Figure I.

A recent search of DCCEEW's Protected Matters Search Tool database for MNES was also undertaken in February 2025 within a 25 km radius of the Project Area to support the preparation of this Preliminary Documentation (DCCEEW 2025a; Appendix S). This identified two additional TECs compared to the July 2023 Protected Matters Search Tool report used in the August 2023 EPBC Act referral:

- Honeymyrtle shrubland on limestone ridges of the Swan Coastal Plain Bioregion TEC. The TEC was not identified in the July 2023 Protected Matters Search Tool report as the TEC was listed as Critically Endangered under the EPBC Act on 15 November 2023 (DCCEEW 2023a)
- Clay Pans of the Swan Coastal Plain TEC. The TEC was not identified in the July 2023 Protected Matters Search Tool report as the mapped extent of the community likely to occur within area was located approximately 25 km from the Project Area, and the July 2023 Protected Matters Search Tool report was based on a 20 km search radius.

A high-level likelihood of occurrence assessment was undertaken for the additional TECs identified in Table 9. The additional TECs are unlikely to occur within the Project Area, therefore they are not assessed further in the Preliminary Documentation.

No other EPBC Act listed threatened ecological communities, including Tuart (*Eucalyptus gomphocephala*) woodlands and forests of the Swan Coastal Plain TEC, were identified as part of any other vegetation survey (RPS 2023; Ecologia Environment 2016; Outback Ecology 2014; Outback Ecology 2010).

Table 10: Threatened Ecological Community identified by February 2025 Protected Matters Search Tool report and likelihood of occurrence within the Project Area

MNES	EPBC Act listing status	Type of presence	Likelihood of occurrence within the Project Area
Honeymyrtle shrubland on limestone ridges of the Swan Coastal Plain Bioregion	Critically Endangered	Community may occur within area (In buffer area only)	Highly unlikely - The Honeymyrtle shrubland on limestone ridges of the Swan Coastal Plain Bioregion TEC is a type of warm temperate shrubland or heath, dominated by <i>Melaleuca huegelii</i> (chenille honeymyrtle), <i>Melaleuca systema</i> (coastal honeymyrtle), and/or <i>Banksia sessilis</i> (parrot bush) (DCCEEW 2023a). It is known to occur in the Perth subregion of the Swan Coastal Plain IBRA bioregion and occurs on shallow to skeletal soils on the ridge slopes and tops of limestone ridges and outcrops - No vegetation types or soil landscape types analogous with this community have been described by any of the vegetation surveys (RPS 2023; Ecologia Environment 2016; Outback Ecology 2014; Outback Ecology 2010) - The Honeymyrtle shrubland on limestone ridges of the Swan Coastal Plain Bioregion TEC was listed as Critically Endangered under the EPBC Act on 15 November 2023 (DCCEEW 2023a). This occurred after the vegetation surveys were undertaken (RPS 2023; Ecologia Environment 2016; Outback Ecology 2014; Outback Ecology 2010), and after the EPBC Act referral was submitted in August 2023. However, the TEC corresponds closely to (and includes all of) the <i>Melaleuca huegelii</i>–<i>M. systema</i> shrublands of limestone ridges TEC, which was listed as Endangered in 1999 under the (then) Western Australian <i>Wildlife Conservation Act 1950</i> (Luu and English 2005). The TEC is currently listed as Critically Endangered under the Western Australian BC Act
Clay Pans of the Swan Coastal Plain	Critically Endangered	Community likely to occur within area (In buffer area only)	Highly unlikely - The Clay Pans of the Swan Coastal Plain TEC is characterised by clay pans, including low lying areas of seasonably inundated / waterlogged clay flats and small basin clay pans (TSSC 2012). The vegetation generally occurs as a shrubland over a ground layer of geophytes, herbs and sedges which are characteristic of the wetter parts of the sites - No vegetation types or soil landscape types analogous with this community have been described by any of the vegetation surveys (RPS 2023; Ecologia Environment 2016; Outback Ecology 2014; Outback Ecology 2010) - The Clay Pans of the Swan Coastal Plain TEC was listed as Critically Endangered under the EPBC Act in 2012 (Department of Parks and Wildlife (DPaW) 2015). Four community types that are components of the Clay Pans of the Swan Coastal Plain TEC are listed as Endangered under the under the Western Australian BC Act

4.4.3.1 Project Area context

Within the 10,493.7 ha Project Area, there is 5.5 ha of native vegetation in primarily good or better condition that is proposed to be cleared as part of the Proposed Action (Figure G and Figure H). Of that 5.5 ha, approximately 0.3 ha of Banksia Low Open Woodland vegetation in Excellent to Good condition is representative of the EPBC Act listed Banksia woodlands of the Swan Coastal Plain TEC (Figure I).

To simplify the assessment of the proposed clearing across the various vegetation surveys undertaken for the Proposed Action (RPS 2023; Ecologia Environment 2016; Outback Ecology 2014; Outback Ecology 2010), the vegetation types described by the surveys have been classified into *abridged native vegetation*

types. A high-level summary of the *abridged native vegetation types* identified within the Native Vegetation Clearing Area is provided below:

- 3.88 ha of Banksia Low Open Woodland (of which 0.3 ha is representative of EPBC Act listed Banksia woodlands of the Swan Coastal Plain TEC).
- 0.22 ha of *Corymbia calophylla* Woodland
- 0.02 ha of *Eucalyptus tottiana* Woodland
- 0.09 ha of Melaleuca Low Open Woodland
- 1.21 ha of Proteaceous Heath
- 0.09 ha of native species identified under planted trees' canopy

Where vegetation was proposed to be cleared but had not been surveyed, the vegetation unit was inferred using the closest extent of surveyed vegetation and a comparison of aerial imagery. A section of planted trees within the Native Vegetation Clearing Area that had not been surveyed was reviewed in August 2023 and found to be primarily planted pine trees and one planted non-endemic Eucalypt tree (RPS and Tilt Renewables 2023). As native flora species were observed beneath the pine trees, the pine trees' canopy has been included in the native vegetation clearing area extent.

The vegetation types as described by the flora and vegetation surveys (RPS 2023; Ecologia Environment 2016; Outback Ecology 2014; Outback Ecology 2010), the condition of those vegetation types, and the extent each type proposed to be cleared in the Native Vegetation Clearing Area are provided in Appendix R.

4.5 Fauna

4.5.1 Environmental investigations

The fauna values of the Project Area have been subject to extensive investigation by site specific fauna surveys and assessments conducted between 2009 and 2025. The site specific fauna surveys and assessments undertaken for the Waddi Wind Farm and key findings relative to fauna listed as MNES under the EPBC Act are presented in Table 11. Combined survey boundaries are presented in Figure J.

Table 11: Site specific fauna surveys and assessments undertaken for the Waddi Wind Farm and key findings relative to EPBC Act listed fauna

Fauna survey	Fauna investigation	Key findings with respect to EPBC Act listed fauna
Avifauna Assessment, Proposed Wind Farm Development Dandaragan Shire (RPS 2010a; Appendix L)	- Field surveys were undertaken to gain information regarding the movements and habits of locally occurring birds. The surveys recorded all locally occurring birds, with particular consideration for Commonwealth and state listed species. Survey boundaries are presented in Figure J. - Targeted avifauna field surveys were undertaken within the Project Area to gain information on occurrence, habits and movements of local birds during two separate survey periods: 29 October to 7 November 2008 18 to 26 November 2008 - A targeted Carnaby's cockatoo survey was also undertaken between 15 to 16 January 2009 - Avian surveys were conducted in association with the adjoining Yandin Wind Farm - Off-site surveys included those areas such as wetlands and lakes in the surrounding region on which locally, regionally and internationally migratory birds might be expected to move between or around	- Most of avifauna observed within the Project Area were common bird species. The greatest diversity of birds occurred within structurally diverse native vegetation, including woodland with intact understorey vegetation, which does not characterise the elevated open country locations selected for wind turbine sitings Six Commonwealth EPBC Act listed Threatened and Migratory fauna species were recorded: - Carnaby's cockatoo (<i>Zanda latirostris</i>) (EPBC Act listing status: Endangered) - Common greenshank (<i>Tringa nebularia</i>) (EPBC Act listing status: Migratory) - Common sandpiper (<i>Actitis hypoleucos</i>) (EPBC Act listing status: Migratory) - Pectoral sandpiper (<i>Calidris melanotos</i>) (EPBC Act listing status: Migratory) - Red-necked Stint (<i>Calidris ruficollis</i>) (EPBC Act listing status: Migratory) - Sharp-tailed sandpiper (<i>Calidris acuminata</i>) (EPBC Act listing status: Vulnerable, Migratory) - Only the Carnaby's cockatoo was observed within the Project Area.
Fauna Assessment, Waddi Wind Farm (RPS 2014; Appendix K)	- Objectives were to establish the fauna species likely to be present in the Project Area and to discuss the likely impacts of the wind farm on these species. Survey boundaries are presented in Figure J. - Level 1 reconnaissance fauna survey for the Project Area was undertaken in November 2008 and a bat survey was conducted in October and November 2008 and May 2009 - An additional site inspection was undertaken in 2013 to provide specialist technical advice to assist in a revision of the data from the 2008 survey, and to inspect sites outside the original footprint due to minor changes in the footprint of the proposed development. This primarily consisted of the transmission line route to the existing Cataby substation and the location of the on-site Waddi substation and associated access and distribution line locations - This report was used to: - Review fauna lists and occurrences and place them in context of their ecological significance	- Faunal diversity across the Project Area was assessed to be depauperate, largely because large tracts of land have already been cleared of native vegetation and replaced with pasture No Commonwealth EPBC Act listed Threatened and Migratory fauna species were recorded.

Fauna survey	Fauna investigation	Key findings with respect to EPBC Act listed fauna
	– Identify fragile habitats in the survey area on which fauna may depend – Identify any ecological processes in the survey area on which fauna may depend – Identify any potential impacts on fauna from the wind farm and make recommendations to minimise impacts	
Waddi Wind Farm Spring Flora and Vegetation Survey and Black Cockatoo Habitat Survey (Outback Ecology 2014; Appendix J)	• Significant fauna habitat assessment for black cockatoos assessed potential breeding, night-roosting, and foraging habitat within two substation options and the proposed transmission line route. Survey boundaries are presented in Figure J. • Significant fauna habitat assessment for black cockatoos was undertaken between 30 October and 1 November 2013 • Locations of hollow-bearing trees were recorded, and the presence of potential food-bearing flora species was noted. Searches for evidence of black cockatoo presence were conducted around trees that potentially act as foraging or roost trees	• Three marri (<i>Corymbia calophylla</i>) trees with potential to develop hollows were found in the survey area where the transmission line route crosses Mullering Brook • Suitable Carnaby's cockatoo foraging habitat was identified, with an abundance of proteaceous species generally located in the transmission line route • Suitable habitat for one Commonwealth EPBC Act listed Threatened fauna species was recorded: – Carnaby's cockatoo (<i>Zanda latirostris</i>) (EPBC Act listing status: Endangered) • No Commonwealth EPBC Act listed Migratory fauna species were recorded.
Waddi Wind Farm proposed action – Cataby Supplementary Flora, Vegetation and Fauna Survey (Ecologia Environment 2016; Appendix I)	• Supplementary survey covering 23.4 ha to inform alteration(s) to the transmission line alignment and substation connection. Survey boundaries are presented in Figure J. • The field component of the survey was conducted on 6 October 2016 (spring). Field survey comprised a targeted survey for foraging habitat and significant trees for Carnaby's cockatoo and targeted tree survey to identify any trees over 10 m high or capable of growing over 10 m in height • Nine separate fauna habitat assessment were conducted at representative locations within broad habitat patches with the identified habitat types mapped. Significant trees and Carnaby's cockatoo foraging habitat and feeding evidence was recorded	• Fourteen species of native fauna and one species of introduced fauna, European rabbit, were recorded • Suitable habitat and presence of one Commonwealth EPBC Act listed Threatened fauna species was recorded: – Carnaby's cockatoo (<i>Zanda latirostris</i>) (EPBC Act listing status: Endangered) • No Commonwealth EPBC Act listed Migratory fauna species were recorded.
Black-Cockatoo habitat assessment for the Waddi Wind Farm transmission line alignment and	• Targeted black cockatoo habitat survey was undertaken between 14–15 October 2021 for a 1,408-ha extent and on 28 October 2022 for an additional 42 ha extent. Survey boundaries are presented in Figure J.	• There were 967 trees classified as in-situ native and non-planted, with the native trees typically being found either in the conservation reserve, in the proposed transmission line route or roadside vegetation

Fauna survey	Fauna investigation	Key findings with respect to EPBC Act listed fauna
the nominated areas in the adjacent farmland (Terrestrial Ecosystems 2022; Appendix H)	- Assessed all vegetation (excluding planted crops, and paddocks cleared or left as fallow) using the foraging habitat categories as described in the <i>Referral guideline for 3 WA threatened black cockatoo species</i> (DAWE 2022) - All potential black cockatoo breeding trees (i.e. eucalypts with a DBH of greater than 500 mm) had their DBH measured and any eucalypt trees with hollows of suitable dimensions for a black cockatoo nesting site were noted and the hollow(s) dimensions recorded	Suitable habitat for one Commonwealth EPBC Act listed Threatened fauna species was recorded: - Carnaby's cockatoo (<i>Zanda latirostris</i>) (EPBC Act listing status: Endangered) No Commonwealth EPBC Act listed Migratory fauna species were recorded.
Desktop analysis of black cockatoo tracking data to show movement and site utilisation of Carnaby's cockatoos in the Cataby region with reference to the Waddi Wind Farm (Murdoch University 2024; Appendix F)	- Murdoch University's night-roost location data and flock movement track data in the vicinity of the Project Area. - Tag deployments attached to 14 individual Carnaby's cockatoo between 2017 and 2022 - Additional information to inform potential site utilisation within the Project Area	- Eight night-roost locations were recorded with 6 km of the Project Area and a further seven night-roost locations were recorded with 12 km of the Project Area. Flocks showed north to south patterns movement with traverses to the west of the Project Area (i.e. Cataby Breeding area, Cooljarloo, Emu Downs, Koonah Road and Badgingarra) associated with consolidated extents of foraging habitat within the Badgingarra Conservation Park (Lot 4134 on Deposited Plan 240347; Crown reserve 41986) and Badgingarra National Park Suitable habitat and presence of one Commonwealth EPBC Act listed Threatened fauna species was recorded: - Carnaby's cockatoo (<i>Zanda latirostris</i>) (EPBC Act listing status: Endangered) No Commonwealth EPBC Act listed Migratory fauna species were recorded.
Carnaby's Black-Cockatoo and Fork-tailed Swift utilisation survey (BCE 2025; Appendix C)	- Carnaby's cockatoo and fork-tailed swift utilisation survey was undertaken in 26–27 August, 7–9 October, 20–22 October and 6, 16-17 and 20 December 2024, and 6–7 and 10 January 2025. Survey boundaries are presented in Figure J - The utilisation survey encompassed Vantage Point surveys (2 Vantage Points within the Project Area, 2 Vantage Points at control sites), acoustic recording (2 units within the Project Area) and Focal Follow surveys (within and up to 6 km outside the Project Area)	- No Fork-tailed swifts were encountered, and the presence of this species is considered unlikely based on existing observations from the Tronox Cooljarloo Mine - Carnaby's cockatoo were frequently encountered during the utilisation survey between August 2024 to January 2025. Activities observed included foraging, roosting, transiting and nesting, with one pair successfully raising a chick out of the nest. Flight behaviours recorded were considered representative of Carnaby's cockatoo during the late winter, spring and early summer (i.e. the breeding season) One Commonwealth EPBC Act listed Threatened and Migratory fauna species was recorded: - Carnaby's cockatoo (<i>Zanda latirostris</i>) (EPBC Act listing status: Endangered) No Commonwealth EPBC Act listed Migratory fauna species were recorded.

4.5.2 Fauna habitat

The key habitat types identified by the fauna surveys (Terrestrial Ecosystems 2022, Ecologia Environment 2016, RPS 2014, Outback Ecology 2014 and RPS 2010a) within the Project Area broadly described as:

- Open pasture / cultivation area, often with scattered trees
- Remnant heathland vegetation
- Woodland remnants / elements
- Areas where various combinations of heathland and/ or woodland are associated with areas dominated by open pasture / cultivation habitats
- Aerial habitats above land for avifauna.

The key habitat types identified by the fauna surveys are validated by the vegetation types and open pasture surveyed by most recently by RPS (2023) flora and vegetation survey.

4.5.3 Conservation significant fauna records

A search of DCCEEW's Protected Matters Search Tool database for MNES within a 20 km radius of a central point was undertaken as part of RPS (2023). A search of the DBCA's Threatened and Priority Fauna database was undertaken in August 2023 for an area within a 25 km radius of the wind farm to support the 2023 EPBC Act referral (DBCA 2023). The database searches were undertaken to identify any Threatened and / or Migratory fauna species (i.e. those species listed under the EPBC Act) that had not been considered in previous fauna survey reports or the previous 2018 EPBC Act referral (EPBC 2018/8352) or were not listed under the EPBC Act at the time of assessment. The EPBC Act listed fauna species records from the DBCA's Threatened and Priority Fauna database for certain MNES are illustrated in Figure K, Figure L and Figure M.

A recent search of DCCEEW's Protected Matters Search Tool database for MNES was also undertaken in February 2025 within a 25 km radius of the Project Area to support the preparation of this Preliminary Documentation (DCCEEW 2025a; Appendix S). This identified one additional fauna species compared to the July 2023 Protected Matters Search Tool report used in the August 2023 EPBC Act referral:

- Woylie. The species was not identified in the July 2023 Protected Matters Search Tool report as the mapped extent of the species or species habitat likely to occur was located at the Nambung National Park, which is located approximately 22 km west of the Project Area (TSSC 2018 and Landgate 2025). The July 2023 Protected Matters Search Tool report was based on a 20 km search radius.

A high-level likelihood of occurrence assessment has been undertaken for the Threatened and migratory species identified by the Protected Matters Search Tool, DBCA's Threatened and Priority Fauna database and identified by the previous fauna reports (BCE 2025, Terrestrial Ecosystems 2022, Ecologia Environment 2016, RPS 2014, RPS 2010a) in Table 12.

Fauna species listed only under the Western Australian BC Act or by the DBCA as a Priority have not been considered by this likelihood of occurrence assessment. Marine species identified by the Protected Matters Search Tool have also been discounted from occurring.

Table 12: Threatened and Migratory fauna species identified by the database searches and likelihood of occurrence within the Project Area

MNES	EPBC Act listing status	Type of presence	Likelihood of occurrence within the Project Area
Birds			
<i>Actitis hypoleucos</i> (common sandpiper)	Migratory (Migratory Wetlands Species)	Species or species habitat may occur within area (In feature area)	Unlikely - The common sandpiper inhabits coastal wetlands and some inland wetlands and is mostly found around muddy margins or rocky shores and rarely on mudflats. The common sandpiper has been recorded in estuaries and deltas of streams, as well as on banks farther upstream; around lakes, pools, billabongs, reservoirs, dams and claypans, and occasionally piers and jetties. The muddy margins utilised by the species are often narrow and may be steep. The species is often associated with mangroves, and sometimes found in areas of mud littered with rocks or snags (DCCEEW 2024a) - There is one record of common sandpiper in DBCA's database within a 25 km radius of the Project Area. The record was associated with the lake north-east of Lake Guraga, over 20 km south of the proposed wind farm (Figure K) - There is no habitat for migratory wading bird species, including the common sandpiper, within or proximate to the Project Area, although there are habitats within the region that are frequented by these species (RPS 2010a). A number of migratory wading bird species were recorded from wetland habitats around Lake Guraga to the south-west, the near coastal Lake Thetis near Cervantes and from the Upper Moore River area to the north-west and west of Moora. This included one observation of a common sandpiper at Lake Thetis, which is located approximately 37 km west-north-west of the Project Area (RPS 2010a) - Movements to and from these wetland habitats by migratory wading birds are likely to follow north to south routes, which follow the general landscape arrangement of these habitats in relation to drainage basins in the east and coastal dune topography in the west (RPS 2010a). As such, it is unlikely that significant movements of migratory wading birds would take place in an east to west direction across the Koodiwoodie Range where the wind farm is to be constructed. Therefore, it is unlikely that the common sandpiper will be placed at significant risk of adverse impact due to the construction and operation of the wind farm
<i>Aphelocephala leucopsis</i> (southern whiteface)	Vulnerable	Species or species habitat may occur within area (In feature area)	Highly unlikely - The southern whiteface is distributed across most of mainland Australia south of the tropics, from the north-eastern edge of the Wheatbelt region of Western Australia to east of the Great Dividing Range. The southern whiteface occupies a wide range of open woodlands and shrublands where there is an understorey of grasses or shrubs or both. These areas are typically in habitats that are dominated by <i>Acacia</i> or <i>Eucalypts</i> on ranges, foothills and lowlands and plains (DCCEEW 2023b). The southern whiteface prefers <i>Acacia</i> woodland particularly those dominated by mulga (<i>Acacia aneura</i>) and drought-resistant chenopod shrub species, including saltbush and bluebush (Atlas of Living Australia 2024a). This species is considered sedentary; however, they may move outside of their normal range into wetter areas during times of drought. Southern whiteface forage almost exclusively on the ground, favouring habitat with low tree densities and an herbaceous understorey litter cover (DCCEEW 2023b) - There are no records of the southern whiteface in DBCA's database within a 25 km radius of the Project Area. This species has not been recorded during the avian surveys conducted within the Project Area (RPS 2014, RPS 2010a). This species has also not been identified as a bird species that may occur proximate to the wind farm or recorded in studies conducted in the nearby Cooljarloo and Falcon areas (RPS 2014) - The Project Area is located on the westernmost edge of the Wheatbelt region, which is a significant distance from the southern whiteface's distribution which ranges from the north-eastern edge of the Wheatbelt region across central Australia (DCCEEW 2023b). This is reflected in the scarcity of occurrence records of this species regionally. The nearest southern whiteface records proximate to the Project Area includes two individuals recorded on 7 September 2021 located approximately 80 km north-north-west (Lake Logue–Indoon System near the Lake Logue Nature Reserve), one individual recorded on 14 August 1995 located approximately 105 km east (Damboring Nature Reserve near salt lakes) and one individual recorded on 22 September 2018 located approximately 113 km to the south-east (near granite outcrop wetlands immediately north of Wongan Hills) (Atlas of Living Australia 2024a). The species is more frequently recorded at distances more than 180 km from the Project Area. The sparse records of the southern whiteface 80 km to 113 km from the Project Area were proximate to water bodies, as such they may reflect individuals flying outside their normal range into wetter areas during times of drought - None of the vegetation types within the Project Area represent the southern whiteface's preferred open woodlands and shrublands where there is an understorey of grasses or shrubs or both, in habitats typically dominated by <i>Acacia</i> or <i>Eucalypts</i> (DCCEEW 2023b). Considering the lack of preferred habitat for southern whiteface, the fact that the Project Area is located outside the normal range for this species, and it is unlikely to provide suitable wetter areas in time of drought, as Mullering Brook is ephemeral, it is highly unlikely that the southern whiteface would occur
<i>Apus pacificus</i> (fork-tailed swift)	Migratory (Migratory Marine Species)	Species or species habitat likely to occur within area (In feature area)	Highly unlikely - The fork-tailed swift is essentially an aerial species that occurs widely over a range of habitats at a range of elevations from quite close to the ground to at least 300 m, although likely higher. Although it occurs across a wide range of habitats within Australia it is mostly observed over inland plains and is seen over coastal beaches and cliffs. A non-breeding visitor to Australian skies from the northern hemisphere, it is more frequently observed in coastal eastern Australia than elsewhere, due to a higher density of observers (DCCEEW 2024b) - There is one record of fork-tailed swift in DBCA's database approximately 29 km to the north of the Project Area (Figure L) - This species has not been recorded during the avian surveys conducted within the Project Area (BCE 2025, RPS 2014, RPS 2010a). Fork-tailed swifts were not observed or heard during a site utilisation survey's Vantage Point or Focal Follow campaigns and have not been detected in decades of biannual surveys at the nearby Cooljarloo Mine (BCE 2025)
<i>Arenaria interpres</i> (ruddy turnstone)	Migratory	Not identified	Unlikely - The ruddy turnstone is widespread within Australia during its non-breeding season and is found in most coastal regions, with occasionally records of inland populations. They exhibit strong preference for beaches or rocky shores where there are large deposits of rotting seaweed. They live near platforms and shelves, often with tidal pools and rocky, gravel or shingle beaches, and can inhabit sand, coral, or shell beaches. They have been occasionally observed in bays, harbours, estuaries and coastal lagoons, on mudflats, among sewage ponds and among saltmarsh or exposed beds of seagrass. The ruddy turnstone can live away from coastal areas in habitats such as inland lakes, riverbeds and adjacent farmland (DCCEEW 2025b) - There are three records of ruddy turnstone in DBCA's database within a 25 km radius of the Project Area (DBCA 2023). The three records were identified approximately 2.4 km west of the Project Area. The three records were collected in 1977 and 1979 - The ruddy turnstone was not identified in the Protected Matters Search Tool search for a 25 km radius of the Project Area (DCCEEW 2025a)

MNES	EPBC Act listing status	Type of presence	Likelihood of occurrence within the Project Area
			- This species has not been recorded during the 2017 avian survey and 2021–2023 bird and bat mortality surveys conducted for Yandin Wind Farm approximately 10 to 25 km south-east of the Project Area (Ecologia Environment 2017, Alinta Energy 2022 and Alinta Energy 2024), or during the 2017–2018 avian surveys and 2019–2020 bird and bat mortality surveys conducted for Badgingarra Wind Farm approximately 15 to 20 km north-west of the Project Area (Ecoscape 2018, Ecoscape 2019a, Ecoscape 2019b and Ecoscape 2020) - There is no habitat for migratory wading bird species, including the ruddy turnstone, within or proximate to the Project Area, although there are habitats within the region that are frequented by these species (RPS 2010). A number of migratory wading bird species were recorded from wetland habitats around Lake Guraga to the south-west, the near coastal Lake Thetis near Cervantes and from the Upper Moore River area to the north-west and west of Moora. The ruddy turnstone was not observed during the avian surveys (RPS 2010) - Movements to and from these wetland habitats by migratory wading birds are likely to follow north–south routes, which follow the general landscape arrangement of these habitats in relation to drainage basins in the east and coastal dune topography in the west (RPS 2010). As such, it is unlikely that significant movements of migratory wading birds would take place in an east–west direction across the Koodiwoodie Range where the wind farm is to be constructed. Therefore, it is unlikely that the ruddy turnstone will be placed at significant risk of adverse impact due to the construction and operation of the wind farm
<i>Botaurus poiciloptilus</i> (Australasian bittern)	Endangered	Not identified	Highly unlikely - Within Western Australia, the Australian bittern was formerly widespread in the south-west, ranging from north to Moora, east to near Mount Arid and inland possibly as far as the Toolibin Lake area. Its distribution has declined throughout the 1900s, and now is likely only to occur along the western coastal plain between Lancelin to Busselton, along the southern coastal plain between Augusta to east of Albany and inland to some wetlands in the Jarrah Forest belt, with isolated and small populations in swamps from west of Esperance eastwards to near Cape Arid. The Australasian bittern favours permanent and seasonal freshwater habitats, particularly those dominated by sedges, rushes, and reeds or cutting grass over a peaty or muddy substrate (TSSC 2019) - There is one record of Australian bittern DBCA's database approximately 25 km to the south of the Project Area (DBCA 2023). The record was associated with the Karo Swamp and was collected in 1921 - The Australasian bittern was not identified in the Protected Matters Search Tool search for a 25 km radius of the Project Area (DCCEEW 2025a) - This species has not been recorded during the 2017 avian survey and 2021–2023 bird and bat mortality surveys conducted for Yandin Wind Farm approximately 10 to 25 km south-east of the Project Area (Ecologia Environment 2017, Alinta Energy 2022 and Alinta Energy 2024), or during the 2017–2018 avian surveys and 2019–2020 bird and bat mortality surveys conducted for Badgingarra Wind Farm approximately 15 to 20 km north-west of the Project Area (Ecoscape 2018, Ecoscape 2019a, Ecoscape 2019b and Ecoscape 2020) - The Project Area is approximately 40 km further north than the Australasian bittern likely current distribution along the western coastal plain between Lancelin to Busselton (TSSC 2019). This is reflected in the scarcity of occurrence records of this species regionally. The nearest Australasian bittern records proximate to the Project Area includes historical records with no dates located approximately 2.4 km to the west, approximately 15 km to the east-south-east, approximately 35 km to the south-east and approximately 40 km to the east, an individual recorded on 25 September 1913 located approximately 15 km to the east-south-east, an individual recorded on 15 October 1921 located approximately 25 km to the south (near Karo Swamp) (Atlas of Living Australia 2025a) - There is no habitat suitable for Australian bittern within or proximate to the Project Area, as there are no permanent and seasonal freshwater habitats within or intersecting the Project Area - This species has not been recorded during the avian surveys conducted within the Project Area (RPS 2014 and RPS 2010). This species is highly unlikely to occur within the Project Area due to the absence of suitable habitat and being situated outside of its likely distribution along the western coastal plain
<i>Calidris acuminata</i> (sharp-tailed sandpiper)	Vulnerable, Migratory (Migratory Wetlands Species)	Species or species habitat may occur within area (In feature area)	Unlikely - The sharp-tailed sandpiper inhabits the muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, salt pans and hypersaline salt lakes inland. They also occur in saltworks and sewage farms. They use flooded paddocks, sedgeland and other ephemeral wetlands, but leave when they dry out (DCCEEW 2024c) - There are two records of sharp-tailed sandpiper in DBCA's database within a 25 km radius of the Project Area. Two records were associated with the lake north-east of Lake Guraga, over 20 km south of the Project Area (Figure K) - There is no habitat for migratory wading bird species, including the sharp-tailed sandpiper, within or proximate to the Project Area, although there are habitats within the region that are frequented by these species (RPS 2010a). Several migratory wading bird species were recorded from wetland habitats around Lake Guraga to the south-west, the near coastal Lake Thetis near Cervantes and from the Upper Moore River area to the north-west and west of Moora. This included 23 observations of sharp-tailed sandpiper at the upper Moore River catchment near Moora, which is located approximately 37 km east of the Project Area (RPS 2010a). The sharp-tailed sandpiper migrates from the northern hemisphere and likely follow similar habitat down the Moore River catchment from the north (RPS 2010a) - Movements to and from these wetland habitats by migratory wading birds are likely to follow north to south routes, which follow the general landscape arrangement of these habitats in relation to drainage basins in the east and coastal dune topography in the west (RPS 2010a). As such, it is unlikely that significant movements of migratory wading birds would take place in an east to west direction across the Koodiwoodie Range where the wind farm is to be constructed. Therefore, it is unlikely that the sharp-tailed sandpiper will be placed at significant risk of adverse impact due to the construction and operation of the wind farm
<i>Calidris canutus</i> (red knot)	Endangered, Migratory (Migratory Wetlands Species)	Species or species habitat may occur within area (In feature area)	Unlikely - The red knot inhabits intertidal mudflats, sandflats and sandy beaches of sheltered coasts, and in estuaries, inlets, harbours and lagoons. They are occasionally seen in terrestrial saline wetlands located near the coast, such as pools, pans, lagoons and lakes, and have been recorded on sewage ponds and saltworks (DCCEEW 2024d) - There are no records of the red knot in DBCA's database within a 25 km radius of the Project Area - There is no habitat for migratory wading bird species, including the red knot, within or proximate to the Project Area, although there are habitats within the region that are frequented by these species (RPS 2010a). Several migratory wading bird species were recorded from wetland habitats around Lake Guraga to the

MNES	EPBC Act listing status	Type of presence	Likelihood of occurrence within the Project Area
			south-west, the near coastal Lake Thetis near Cervantes and from the Upper Moore River area to the north-west and west of Moora. The red knot was not observed during the avian surveys (RPS 2010a) Movements to and from these wetland habitats by migratory wading birds are likely to follow north to south routes, which follow the general landscape arrangement of these habitats in relation to drainage basins in the east and coastal dune topography in the west (RPS 2010a). As such, it is unlikely that significant movements of migratory wading birds would take place in an east to west direction across the Koodiwoodie Range where the wind farm is to be constructed. Therefore, it is unlikely that the red knot will be placed at significant risk of adverse impact due to the construction and operation of the wind farm
<i>Calidris ferruginea</i> (curlew sandpiper)	Critically Endangered, Migratory (Migratory Wetlands Species)	Species or species habitat may occur within area (In feature area)	Unlikely - The curlew sandpiper mainly occurs on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand (DCCEEW 2024e) - There are two records of curlew sandpiper in DBCA's database within a 25 km radius of the Project Area. One record was associated with the lake north-east of Lake Guraga, over 20 km south of the Project Area, and another record was identified approximately 2.4 km west of the Project Area (Figure K). The two records were collected in 1978 and 1991 - There is no habitat for migratory wading bird species, including the curlew sandpiper, within or proximate to the Project Area, although there are habitats within the region that are frequented by these species (RPS 2010a). Several migratory wading bird species were recorded from wetland habitats around Lake Guraga to the south-west, the near coastal Lake Thetis near Cervantes and from the Upper Moore River area to the north-west and west of Moora. The curlew sandpiper was not observed during the avian surveys (RPS 2010a) - Movements to and from these wetland habitats by migratory wading birds are likely to follow north to south routes, which follow the general landscape arrangement of these habitats in relation to drainage basins in the east and coastal dune topography in the west (RPS 2010a). As such, it is unlikely that significant movements of migratory wading birds would take place in an east to west direction across the Koodiwoodie Range where the wind farm is to be constructed. Therefore, it is unlikely that the curlew sandpiper will be placed at significant risk of adverse impact due to the construction and operation of the wind farm
<i>Calidris melanotos</i> (pectoral sandpiper)	Migratory (Migratory Wetlands Species)	Species or species habitat may occur within area (In feature area)	Unlikely - The pectoral sandpiper prefers shallow fresh to saline wetlands, and can be found in estuaries, lakes, river pools, artificial wetlands, coastal lagoons, bays, inundated grasslands, saltmarshes and flood plains. They usually inhabit coastal or near coastal habitat but can be found further inland occasionally (DCCEEW 2024f) - There are no records of the pectoral sandpiper in DBCA's database within a 25 km radius of the Project Area (Figure K) - There is no habitat for migratory wading bird species, including the pectoral sandpiper, within or proximate to the Project Area, although there are habitats within the region that are frequented by these species (RPS 2010a). Several migratory wading bird species were recorded from wetland habitats around Lake Guraga to the south-west, the near coastal Lake Thetis near Cervantes and from the Upper Moore River area to the north-west and west of Moora. This included one observation of a pectoral sandpiper at the upper Moore River catchment near Moora, which is located approximately 37 km east of the Project Area (RPS 2010a). The pectoral sandpiper migrates from the northern hemisphere and likely follows similar habitat down the Moore River catchment from the north (RPS 2010a) - Movements to and from these wetland habitats by migratory wading birds are likely to follow north to south routes, which follow the general landscape arrangement of these habitats in relation to drainage basins in the east and coastal dune topography in the west (RPS 2010a). As such, it is unlikely that significant movements of migratory wading birds would take place in an east to west direction across the Koodiwoodie Range where the wind farm is to be constructed. Therefore, it is unlikely that the pectoral sandpiper will be placed at significant risk of adverse impact due to the construction and operation of the wind farm
<i>Calidris ruficollis</i> (red-necked stint)	Migratory (Migratory Wetlands Species)	Not identified	Unlikely - The red-necked stint inhabits coastal areas, such as estuaries within intertidal mudflats, lagoons, bays and sheltered inlets. They are also found in ephemeral and permanent shallow wetlands near the coast or inland, in saltworks and sewage farms, saltmarsh, lakes, riverbanks, dams, soaks, and pools in salt flats. They sometimes use flooded paddocks or damp grasslands (DCCEEW 2024g) - There are eight records of red-necked stint in DBCA's database within a 25 km radius of the Project Area. Three records were associated with a lake north-east of Lake Guraga and at Lake Guraga, over 20 km south of the Project Area and another five records were identified approximately 2.4 km west of the Project Area. The eight records were collected in 1977 to 1979, 1990, 1991 and 1999 - There is no habitat for migratory wading bird species, including the red-necked stint, within or proximate to the Project Area, although there are habitats within the region that are frequented by these species (RPS 2010a). Several migratory wading bird species were recorded from wetland habitats around Lake Guraga to the south-west, the near coastal Lake Thetis near Cervantes and from the Upper Moore River area to the north-west and west of Moora. This included 35 observations of red-necked stints at the southern shoreline habitats of Lake Guraga and nearby lakes, which is located approximately 20 km to the south of the Project Area. They were observed foraging during the night at the north-east lake and movements were limited to accessing different foraging areas of the shoreline (RPS 2010a) - Movements to and from these wetland habitats by migratory wading birds are likely to follow north to south routes, which follow the general landscape arrangement of these habitats in relation to drainage basins in the east and coastal dune topography in the west (RPS 2010a). As such, it is unlikely that significant movements of migratory wading birds would take place in an east to west direction across the Koodiwoodie Range where the wind farm is to be constructed. Therefore, it is unlikely that red-necked stints will be placed at significant risk of adverse impact due to the construction and operation of the wind farm

REPORT

MNES	EPBC Act listing status	Type of presence	Likelihood of occurrence within the Project Area
<i>Calyptorhynchus banksii naso</i> (forest red-tailed black cockatoo)	Vulnerable	Not identified	Highly unlikely - Breeding habitat for forest red-tailed black cockatoo comprises woodland or forest and partially cleared woodland or forest including isolated trees. They nest in hollows of live or dead trees, and many <i>Eucalyptus</i> species may provide suitable hollows. Any tall trees may provide roosting habitat, particularly jarrah, marri, karri, blackbutt, tuart, introduced eucalypts or large trees on forest edges. Forest red-tailed black cockatoos forage primarily on seeds of jarrah and marri in woodlands and forest, and edges of karri forests, including wandoo and blackbutt. They also forage on cones of <i>Allocasuarina</i>, fruits of snottygobble (<i>Persoonia longifolia</i>) and mountain marri (<i>Corymbia haematoxylon</i>), and on less important food sources, such as blackbutt, bullich, <i>Allocasuarina fraseriana</i>, <i>Hakea</i> sp., tuart, redheart moit (<i>Eucalyptus decipens</i>) and bushy yate (<i>Eucalyptus lehmanni</i>) (DAWE 2022) - The Project Area is outside of the forest red-tailed black cockatoo's modelled distribution (DAWE 2022). The northernmost extent of where the modelled species or species habitat may occur is near Boonanarring Nature Reserve, which is located over 70 km south of the Project Area - There are no records of forest red-tailed black cockatoo in the DBCA's database within a 25 km radius of the Project Area. There are no Atlas of Living Australia occurrence records of forest red-tailed black cockatoo proximate to the Project Area, with the nearest record located approximately 65 km to the south-east observed in 2018 (Atlas of Living Australia 2025b) - Foraging evidence of marri nuts with chew marks consistent with forest red-tailed black cockatoo were found under a marri tree north of the Waddi Road reserve, located within the roost area in the Project Area's north-eastern extent (Figure M) (BCE 2025). The chew marks were recent but not fresh. Landowners advised that forest red-tailed black cockatoos are seen and heard in the area very infrequently and possibly not every year. Forest red-tailed black cockatoos have not been observed or heard during the avian surveys conducted within the Project Area (BCE 2025, RPS 2014, RPS 2010a), or recorded during surveys and mortality monitoring undertaken for the neighbouring wind farms (Ecologia Environment 2017; Alinta Energy 2022; Alinta Energy 2024; Ecoscape 2018, Ecoscape 2019a, Ecoscape 2019b and Ecoscape 2020) - Forest red-tailed black cockatoos are likely to occur very infrequently at the Project Area (BCE 2025)
<i>Charadrius leschenaultii</i> (greater sand plover)	Migratory	Not identified	Highly unlikely - The greater sand plover is found in many coastal areas of Australia during its non-breeding season, inhabiting littoral and estuarine habitats. They mainly occur on sheltered sandy, shelly, or muddy beaches with large intertidal mudflats or sandbanks, as well as sandy estuarine lagoons and rock platforms, sand cays, small rocky islands and inshore reefs. They seldom occur in shallow freshwater wetlands (DCCEEW 2025c). - There was one record of greater sand plover in DBCA's database within a 25 km radius of the Project Area (DBCA 2023). The record was identified approximately 2.4 km west of the Project Area. The record was collected in 1977. - The greater sand plover was not identified in the Protected Matters Search Tool search for a 25 km radius of the Project Area (DCCEEW 2025a). - This species has not been recorded during the 2017 avian survey and 2021–2023 bird and bat mortality surveys conducted for Yandin Wind Farm approximately 10 to 25 km south-east of the Project Area (Ecologia Environment 2017, Alinta Energy 2022 and Alinta Energy 2024), or during the 2017–2018 avian surveys and 2019–2020 bird and bat mortality surveys conducted for Badgingarra Wind Farm approximately 15 to 20 km north-west of the Project Area (Ecoscape 2018, Ecoscape 2019a, Ecoscape 2019b and Ecoscape 2020). - There is no habitat suitable for greater sand plover within or proximate to the Project Area, as it is situated approximately 31 km east of the Western Australian coastline. - This species has not been recorded during the avian surveys conducted within the Project Area (RPS 2014 and RPS 2010). This species is highly unlikely to occur within the Project Area due to the absence of suitable habitat.
<i>Leipoa ocellata</i> (malleefowl)	Vulnerable	Species or species habitat likely to occur within area (In feature area)	Highly unlikely - The malleefowl occurs in temperate Australia largely limited to the semi-arid zone. They are mostly limited to areas of inland semi-arid scrub, this species prefers a dry environment with low-growing eucalypt trees and shrubs, referred to as mallee country. Although their diet exhibits seasonal variation, they mostly feed on ants and the seeds of wattle and other legume plants. In Western Australia, they are found in some shrublands dominated by acacia and occasionally in woodlands dominated by eucalypts such as wandoo, marri, and mallet (<i>Eucalyptus astringens</i>) Malleefowl distribution within the Wheatbelt region of Western Australia was found to be associated with landscapes that had lower rainfall, greater amounts of mallee and shrubland that occur as large remnants, and lighter soil surface textures (Benshemesh 2007) - Native vegetation types mapped within the Project Area include Proteaceous scrub heath, Banksia Low Open Woodland, <i>Melaleuca</i> Low Open Woodland, <i>Eucalyptus tottiana</i> Woodland, and <i>Corymbia calophylla</i> Woodland. None of the Project Area's vegetation types were comprised of mallee shrubland or shrublands dominated by acacia, however woodland vegetation was identified (RPS 2023; Ecologia Environment 2016; Outback Ecology 2014; Outback Ecology 2010). Areas of <i>Corymbia calophylla</i> Woodland were found to be in Completely Degraded condition, as such these areas are unlikely to represent suitable habitat for the malleefowl. Native vegetation within the Project Area is fragmented by areas cleared for agricultural land uses. The fragmented nature of native vegetation in the Project Area and its surroundings would make it difficult for the malleefowl to persist - There are no records of the malleefowl in DBCA's database within a 25 km radius of the Project Area - This species has not been recorded during the avian surveys conducted within the Project Area (RPS 2014, RPS 2010a). This species is highly unlikely to occur within the Project Area due to the absence of suitable habitat

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<i>Limosa lapponica</i> (bar-tailed godwit)	Migratory	Not identified	Highly unlikely - Bar-tailed godwits are found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays (DCCEEW 2025d). It is found often around beds of seagrass and, sometimes, in nearby saltmarsh. Bar-tailed godwits have been sighted in coastal sewage farms and saltworks, salt lakes and brackish wetlands near coasts, sandy ocean beaches, rock platforms, and coral reef-flats. It is rarely found on inland wetlands or in areas of short grass, such as farmland, paddocks and airstrips. - There were two records of bar-tailed godwit in DBCA’s database within a 25 km radius of the Project Area (DBCA 2023). The two records were identified approximately 2.4 km west of the Project Area. The two records were collected in 1977 and 1979. - The bar-tailed godwit was not identified in the Protected Matters Search Tool search for a 25 km radius of the Project Area (DCCEEW 2025a). - This species has not been recorded during the 2017 avian survey and 2021–2023 bird and bat mortality surveys conducted for Yandin Wind Farm approximately 10 to 25 km south-east of the Project Area (Ecologia Environment 2017, Alinta Energy 2022 and Alinta Energy 2024), or during the 2017–2018 avian surveys and 2019–2020 bird and bat mortality surveys conducted for Badgingarra Wind Farm approximately 15 to 20 km north-west of the Project Area (Ecoscape 2018, Ecoscape 2019a, Ecoscape 2019b and Ecoscape 2020). - There is no habitat suitable for bar-tailed godwit within or proximate to the Project Area, as it is situated approximately 31 km east of the Western Australian coastline. - This species has not been recorded during the avian surveys conducted within the Project Area (RPS 2014 and RPS 2010). This species is highly unlikely to occur within the Project Area due to the absence of suitable habitat.
<i>Motacilla cinerea</i> (grey wagtail)	Migratory (Migratory Terrestrial Species)	Species or species habitat may occur within area (In feature area)	Highly unlikely - The grey wagtail is a very widespread species, with 20% of the global range in Europe. It is found across much of northern Africa, Europe and Asia, ranging from western Europe to East Asia. The grey wagtail is found around fast flowing mountain streams, often in forested areas, as well as lowland watercourses such as canals and rivers. Outside of the breeding season it is found in a greater variety of habitats, including farmlands, forested tracks, plantations and even town centres. Grey wagtail populations from islands and southern locations are resident, while other populations are partially or fully migratory. The grey wagtail is a vagrant to Australia and does not spend its breeding season within Australia (BirdLife International 2024a) - There are no records of the grey wagtail in DBCA’s database within a 25 km radius of the Project Area - This species has not been recorded during the avian surveys conducted within the Project Area (RPS 2014, RPS 2010a). This species has also not been identified as a bird species that may occur in similar nearby habitat proximate to the Project Area or recorded in studies conducted in the nearby Cooljarloo and Falcon areas (RPS 2014). The grey wagtail is almost exclusively recorded near water, and therefore is highly unlikely to occur within the Project Area due to the absence of suitable habitat
<i>Numenius madagascariensis</i> (eastern curlew)	Critically Endangered, Migratory (Migratory Wetlands Species)	Species or species habitat may occur within area (In feature area)	Highly unlikely - Within Australia, the eastern curlew has a primarily coastal distribution. The species is found in all states, particularly the north, east, and south-east regions including Tasmania. Eastern curlews are rarely recorded inland. They have a continuous distribution from Barrow Island and Dampier Archipelago, Western Australia, through the Kimberley Division and along Northern Territory, Queensland, and NSW coasts and the islands of Torres Strait. They are patchily distributed elsewhere. The eastern curlew is most commonly associated with sheltered coasts, especially estuaries, bays, harbors, inlets and coastal lagoons, with large intertidal mudflats or sand flats, often with beds of seagrass. Occasionally, the species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets. The birds are often recorded among salt marshes and on mudflats fringed by mangroves and sometimes use the mangroves. The birds are also found in salt works and sewage farms (DCCEEW 2024h) - There are no records of the eastern curlew in DBCA’s database within a 25 km radius of the Project Area - There is no habitat for migratory wading bird species, including the eastern curlew, within or proximate to the Project Area, although there are habitats within the region that are frequented by these species (RPS 2010a) - This species has not been recorded during the avian surveys conducted within the Project Area (RPS 2014, RPS 2010a). This species is highly unlikely to occur within the Project Area due to the absence of suitable habitat
<i>Pandion haliaetus</i> (osprey)	Migratory (Migratory Wetlands Species)	Species or species habitat known to occur within area (In buffer area only)	Highly unlikely - Ospreys occur in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands. They are mostly found in coastal areas but occasionally travel inland along major rivers, particularly in northern Australia. They exhibit a preference for coastal cliffs and elevated islands in some parts of their range, but may also occur on low sandy, muddy or rocky shores and over coral cays (DCCEEW 2024i) - There are no records of the osprey in DBCA’s database within a 25 km radius of the Project Area - There is no habitat suitable for osprey within or proximate to the Project Area, as it is situated approximately 31 km east of the Western Australian coastline and there are no terrestrial wetlands or major rivers within or intersecting the Project Area - This species has not been recorded during the avian surveys conducted within the Project Area (RPS 2014, RPS 2010a). This species is highly unlikely to occur within the Project Area due to the absence of suitable habitat
<i>Pezoporus flaviventris</i> or <i>Pezoporus wallicus flaviventris</i> (western ground parrot)	Critically Endangered	Not identified	Locally extinct - The western ground parrot is a ground-dwelling bird that occupies low, dry or swampy near-coastal heathlands on sand plains and uplands The species is usually recorded in habitats that are unburnt for long periods of time. They can forage in recently burnt habitats; however, these habitats are unsuitable for breeding and are only used occasionally. The western ground parrot's distribution is restricted to near coastal regions of south-western Western Australia. They are currently known to occur in two locations, Fitzgerald River National Park and Cape Arid National Park- Nuytsland Nature Reserve (TSSC 2013) - There are no records of the western ground parrot in DBCA's database within a 25 km radius of the Project Area and the nearest western ground parrot record proximate to the Project is over 500 km to the south-east (Atlas of Living Australia 2024b) - This species has not been recorded during the avian surveys conducted within the Project Area (RPS 2014, RPS 2010a). However, the species (<i>Pezoporus wallicus</i>) was identified as a bird species that may occur in similar nearby habitat within the Project Area's vicinity or recorded in studies conducted in the nearby

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			Cooljarloo and Falcon areas (RPS 2014). There have been several unconfirmed sightings in the Jurien–Leeman–Badgingarra–Mt Adams area, including one report near the intersection of Wongonderrah Road and Brand Highway, just north of the Project Area (RPS 2014) The Project Area is significantly removed from where the western ground parrot populations are known to occur in the Fitzgerald River National Park and Cape Arid National Park- Nuytsland Nature Reserve (TSSC 2013). This species is likely to be locally extinct in the locality of the proposed wind farm
<i>Plegadis falcinellus</i> (glossy ibis)	Migratory	Not identified	Highly unlikely - Glossy Ibis' preferred habitat for foraging and breeding are freshwater marshes at the edges of lakes and rivers, lagoons, flood plains, wet meadows, swamps, reservoirs, sewage ponds, rice fields and cultivated areas under irrigation. The species is occasionally located in coastal locations such as deltas, saltmarshes, coastal lagoons, and estuaries. Within Western Australia, the glossy ibis is found generally east of the Kimberley and is also known to be patchily distributed across the state (DCCEEW 2025e). - There were three records of glossy ibis in DBCA's database within a 25 km radius of the Project Area (DBCA 2023). All records were associated with water sources, with one record near a flood plain wetland and stream (over 8 km to the south-west) and two records near the lake adjacent to Guraga Lake (over 19 km south of the project) (Landgate 2025). The records were collected in 1990 and 1999. - The glossy ibis was not identified in the Protected Matters Search Tool search for a 25 km radius of the Project Area (DCCEEW 2025a). - This species has not been recorded during the 2017 avian survey and 2021–2023 bird and bat mortality surveys conducted for Yandin Wind Farm approximately 10 to 25 km south-east of the Project Area (Ecologia Environment 2017, Alinta Energy 2022 and Alinta Energy 2024), or during the 2017–2018 avian surveys and 2019–2020 bird and bat mortality surveys conducted for Badgingarra Wind Farm approximately 15 to 20 km north-west of the Project Area (Ecoscape 2018, Ecoscape 2019a, Ecoscape 2019b and Ecoscape 2020). - This species has not been recorded during the avian surveys conducted within the Project Area (RPS 2014 and RPS 2010). This species is highly unlikely to occur within the Project Area due to the absence of suitable habitat.
<i>Pluvialis fulva</i> (Pacific golden plover)	Migratory	Not identified	Highly unlikely - The Pacific golden plover utilises coastal habitats in Australia for their non-breeding grounds, however they occasionally occur around inland wetlands. They inhabit beaches, mudflats and sandflats in sheltered areas, such as lagoons, estuaries and harbours, and also in saltwork evaporation ponds. They are infrequently recorded around terrestrial wetlands, such as fresh, brackish, or saline lakes, billabongs, pools, swamps and wet claypans. Within Western Australia, the Pacific golden plover is not often recorded along the southern or south-western coasts, but they are more widespread along the Pilbara and Kimberley coasts between North-West Cape and the Northern Territory border (DCCEEW 2025f). - There was one record of Pacific golden plover in DBCA's database within a 25 km radius of the Project Area (DBCA 2023). The record was associated with water sources as it was near the lake adjacent to Guraga Lake (over 19 km south of the project) (Landgate 2025). The record was collected in 1991. - The Pacific golden plover was not identified in the Protected Matters Search Tool search for a 25 km radius of the Project Area (DCCEEW 2025a). - This species has not been recorded during the 2017 avian survey and 2021–2023 bird and bat mortality surveys conducted for Yandin Wind Farm approximately 10 to 25 km south-east of the Project Area (Ecologia Environment 2017, Alinta Energy 2022 and Alinta Energy 2024), or during the 2017–2018 avian surveys and 2019–2020 bird and bat mortality surveys conducted for Badgingarra Wind Farm approximately 15 to 20 km north-west of the Project Area (Ecoscape 2018, Ecoscape 2019a, Ecoscape 2019b and Ecoscape 2020). - This species has not been recorded during the avian surveys conducted within the Project Area (RPS 2014 and RPS 2010). This species is highly unlikely to occur within the Project Area due to the absence of suitable habitat.
<i>Pluvialis squatarola</i> (grey plover)	Migratory	Not identified	Highly unlikely - The grey plover utilises coastal areas in Australia for their non-breeding grounds. They inhabit sheltered embayments, estuaries and lagoons with mudflats and sandflats, and occasionally on rocky coasts. They are found around terrestrial wetlands, such as near-coastal lakes and swamps or salt lakes. Further inland, they are infrequently found near wetlands or salt-lakes. The Grey plover has been recorded across all states along the costs, and it is most abundant on the western and southern coastlines. In Western Australia, this is mainly between Albany and the northern Kimberly coast (DCCEEW 2025g). - There was one record of grey plover in DBCA's database within a 25 km radius of the Project Area (DBCA 2023). The record was identified approximately 2.4 km west of the Project Area. The record was collected in 1977. - The grey plover was not identified in the Protected Matters Search Tool search for a 25 km radius of the Project Area (DCCEEW 2025a). - This species has not been recorded during the 2017 avian survey and 2021–2023 bird and bat mortality surveys conducted for Yandin Wind Farm approximately 10 to 25 km south-east of the Project Area (Ecologia Environment 2017, Alinta Energy 2022 and Alinta Energy 2024), or during the 2017–2018 avian surveys and 2019–2020 bird and bat mortality surveys conducted for Badgingarra Wind Farm approximately 15 to 20 km north-west of the Project Area (Ecoscape 2018, Ecoscape 2019a, Ecoscape 2019b and Ecoscape 2020). - This species has not been recorded during the avian surveys conducted within the Project Area (RPS 2014 and RPS 2010). This species is highly unlikely to occur within the Project Area due to the absence of suitable habitat.
<i>Rostratula australis</i> (Australian painted snipe)	Endangered	Species or species habitat likely to occur within area (In feature area)	Highly unlikely - The Australian painted snipe has been recorded at wetlands in all states of Australia and mainly occurs along the eastern and south-eastern coast of Australia. They generally inhabit shallow terrestrial wetlands, including permanent and temporary lakes, claypans and swamps, waterlogged grasslands, dams, rice crops and sewage farms. Their habitats typically include emergent tussocks of grass, rushes, sedges, reeds, or samphire, often with scattered lignum, tea-tree (Melaleuca) or cane grass. Areas lined with trees or with scattered fallen or washed-up timber may be used by the Australian painted snipe also (DCCEEW 2024j) - There are no records of the Australian painted snipe in DBCA's database within a 25 km radius of the Project Area - There is no habitat for wading bird species, including the Australian painted snipe, within or proximate to the Project Area, although there are habitats within the region that are frequented by these species (RPS 2010a) - This species has not been recorded during the avian surveys conducted within the Project Area (RPS 2014, RPS 2010a). This species is highly unlikely to occur within the Project Area due to the absence of suitable habitat

MNES	EPBC Act listing status	Type of presence	Likelihood of occurrence within the Project Area
<i>Sterna nereis nereis</i> (Australian fairy tern)	Vulnerable	Species or species habitat may occur within area (In buffer area only)	Highly unlikely - Within Australia, the Australian fairy tern occurs along the coasts of Victoria, Tasmania, South Australia and Western Australia, occurring as far north as the Dampier Archipelago near Karratha. This species nests on sheltered sandy beaches, spits and banks above the high tide line and below vegetation and has been found in embayments of a variety of habitats including offshore, estuarine or lacustrine (lake) islands, wetlands and mainland coastline (DCCEEW 2024k). - There is no habitat suitable for Australian fairy tern within or proximate to the Project Area, as it is situated approximately 31 km east of the Western Australian coastline and there are no wetlands or estuarine or lacustrine islands within or intersecting the Project Area. - This species has not been recorded during the avian surveys conducted within the Project Area (RPS 2014, RPS 2010a). This species is highly unlikely to occur within the Project Area due to the absence of suitable habitat.
<i>Thalasseus bergii</i> (crested tern)	Migratory	Not identified	Highly unlikely - The crested tern occupies tropical and subtropical coastlines, and forages within shallow waters of lagoons, coral reefs, estuaries, bays, inlets and harbours, along sandy, rocky, coral or muddy shores, on rocky outcrops in open sea, in mangrove swamps and also out to sea on open water. They are distributed on coastlines and islands in the tropics and subtropics, including Australia (BirdLife International 2025). - There were three records of crested tern in DBCA's database within a 25 km radius of the Project Area (DBCA 2023). All three records were identified approximately 2.4 km west of the Project Area. The records were collected in 1977, 1978 and 1979. - The crested tern was not identified in the Protected Matters Search Tool search for a 25 km radius of the Project Area (DCCEEW 2025a). - This species has not been recorded during the 2017 avian survey and 2021–2023 bird and bat mortality surveys conducted for Yandin Wind Farm approximately 10 to 25 km south-east of the Project Area (Ecologia Environment 2017, Alinta Energy 2022 and Alinta Energy 2024), or during the 2017–2018 avian surveys and 2019–2020 bird and bat mortality surveys conducted for Badgingarra Wind Farm approximately 15 to 20 km north-west of the Project Area (Ecoscape 2018, Ecoscape 2019a, Ecoscape 2019b and Ecoscape 2020). - This species has not been recorded during the avian surveys conducted within the Project Area (RPS 2014 and RPS 2010). This species is highly unlikely to occur within the Project Area due to the absence of suitable habitat and as it is situated approximately 31 km east of the Western Australian coastline.
<i>Tringa glareola</i> (wood sandpiper)	Migratory	Not identified	Highly unlikely - The wood sandpiper inhabits well-vegetated, shallow, freshwater wetlands, such as swamps, billabongs, lakes, pools and waterholes. They are typically associated with emergent, aquatic plants or grass, and dominated by taller fringing vegetation, such as dense stands of rushes or reeds, shrubs, or dead or live trees, especially <i>Melaleuca</i> and river red gums (<i>Eucalyptus camaldulensis</i>) and often with fallen timber. They also frequent inundated grasslands, short herbage or wooded flood plains, where floodwaters are temporary or receding, and irrigated crops. They are also found at some small wetlands only when they are drying. The wood sandpiper has been recorded in large numbers in north-west Australia. Within Western Australia, the species is widespread but scattered in most regions (DCCEEW 2025h). - There were two records of wood sandpiper in DBCA's database within a 25 km radius of the Project Area (DBCA 2023). The records were associated with water sources as they were found near the lake adjacent to Guraga Lake (over 19 km south of the project) (Landgate 2025). The records were collected in 1990 and 1991. - The wood sandpiper was not identified in the Protected Matters Search Tool search for a 25 km radius of the Project Area (DCCEEW 2025a). - This species has not been recorded during the 2017 avian survey and 2021–2023 bird and bat mortality surveys conducted for Yandin Wind Farm approximately 10 to 25 km south-east of the Project Area (Ecologia Environment 2017, Alinta Energy 2022 and Alinta Energy 2024), or during the 2017–2018 avian surveys and 2019–2020 bird and bat mortality surveys conducted for Badgingarra Wind Farm approximately 15 to 20 km north-west of the Project Area (Ecoscape 2018, Ecoscape 2019a, Ecoscape 2019b and Ecoscape 2020). - This species has not been recorded during the avian surveys conducted within the Project Area (RPS 2014 and RPS 2010). This species is highly unlikely to occur within the Project Area due to the absence of suitable habitat.
<i>Tringa nebularia</i> (common greenshank)	Migratory (Migratory Wetlands Species)	Species or species habitat likely to occur within area (In buffer area only)	Unlikely - Common greenshanks are found in a wide variety of inland wetlands and sheltered coastal habitats of varying salinity. They occur in sheltered coastal habitats, typically with large mudflats and saltmarsh, mangroves or seagrass. The species uses both permanent and ephemeral terrestrial wetlands, including swamps, lakes, dams, rivers, creeks, billabongs, waterholes and inundated flood plains, claypans and salt flats. It was once recorded with black-winged stilts (<i>Himantopus himantopus</i>) in pasture but are generally not found in dry grassland. (DCCEEW 2024l) - There are six records of common greenshank in DBCA's database within a 25 km radius of the Project Area. Most records are associated with the lakes north-east and south of Lake Guraga, over 20 km south of the Project Area, and another record was identified approximately 2.4 km west of the Project Area. The six records were collected in 1978, 1979, 1990, 1991, and 2001. - There is no habitat for migratory wading bird species, including the common greenshank, within or proximate to the Project Area, although there are habitats within the region that are frequented by these species (RPS 2010a). - Several migratory wading bird species were recorded from wetland habitats around Lake Guraga to the south-west, the near coastal Lake Thetis near Cervantes and from the Upper Moore River area to the north-west and west of Moora. This included one observation of a common greenshank at the southern shoreline habitats of Lake Guraga and nearby lakes, which is located approximately 20 km to the south of the Project Area, and 23 observations of common greenshank at the Lake Thetis, which is located approximately 37 km west-north-west of the Project Area (RPS 2010a). - Movements of common greenshanks were observed at the lake north-east of Lake Guraga and at Lake Thetis, which suggests that there may be some movements between the inland and coast when conditions are favourable (RPS 2010a). Movements to and from these wetland habitats by migratory wading birds are likely to follow north to south routes, which follow the general landscape arrangement of these habitats in relation to drainage basins in the east and coastal dune topography in the west (RPS 2010a). As such, it is unlikely that significant movements of migratory wading birds would take place in an east to west direction across the Koodiwoodie Range where the wind farm is to be constructed. Therefore, it is unlikely that common greenshanks will be placed at significant risk of adverse impact due to the construction and operation of the wind farm.

MNES	EPBC Act listing status	Type of presence	Likelihood of occurrence within the Project Area
<i>Zanda latirostris</i> (Carnaby's cockatoo)	Endangered	Breeding known to occur within area (In feature area)	Seasonal roosting, breeding and foraging visitor - Breeding habitat for Carnaby's cockatoo comprises woodland or forest and partially cleared woodland or forest including isolated trees. They nest in hollows of live or dead trees, and many <i>Eucalyptus</i> species may provide suitable hollows. Carnaby's cockatoos roost in or near riparian environments or natural or artificial water sources. Any tall trees may provide roosting habitat, particularly flat-topped yate (<i>Eucalyptus occidentalis</i>), salmon gum, wandoo, marri, karri, blackbutt, tuart, introduced eucalypts and introduced pines. They forage in native shrubland, heathland and woodland on seeds, nectar and flowers of native proteaceous plant species. They also forage on seeds of introduced species, including <i>Pinus</i> spp., <i>Erodium</i> spp., wild radish, canola, almonds, macadamia and pecan nuts; insects and insect larvae; occasionally apples and persimmons; and liquidambar (DAWE 2022) - There are 298 records of Carnaby's cockatoo in the DBCA's database within a 25 km radius of the Project Area. Only one record in DBCA's database was within the Project Area and was situated over 2 km to the east of the turbine locations (Figure M) - Carnaby's cockatoos have been observed frequently within 20 km of the Project Area. There are DBCA records of one roosting site and 99 confirmed and potential breeding sites, which are typically located adjacent to watercourses (Figure N). Ninety-six of the 99 breeding sites are within 12 km of the Project Area. This includes the Cataby Key Biodiversity Area, which supports up to 24 breeding pairs of Carnaby's cockatoo, located approximately 8 km south of the Project Area (BirdLife International 2022). Carnaby's cockatoos mainly forage in areas up to 12 km from nesting trees during the breeding season and in areas up to 20 km, or higher, from known night-roosting habitat during the non-breeding season (DAWE 2022). Murdoch University (2024) have recorded 14 roost sites within 12 km radius of the Project Area (Figure N) - This species was recorded during the avian surveys conducted within the Project Area and there is suitable foraging, breeding and roosting habitat for Carnaby's cockatoo present (BCE 2025, RPS 2014, RPS 2010a). The 2008 – 2009 and 2013 surveys found that habitat utilisation was consistent with what is generally known for this species, where on-site occurrences were largely confined to intact marri (<i>Corymbia calophylla</i>) woodland areas, which occur as riparian remnants along valley bottom watercourses and lower slopes, and tall heathland communities and their remnants on sand plains and lower slopes in the wider locality. Local movements were restricted to valley vegetation corridors and rarely traversed more elevated open country at low elevations. During the survey period (October and November 2008 and January 2009), a large flock (200+) was noted over a pine plantation east of Cervantes, over 30 km north-west of the Project Area - The 2024–2025 utilisation survey found Carnaby's cockatoo foraging and feeding on Hakea, Banksia, Marri and pines, with Banksia heath and Marri woodland frequently targeted by the species. Foraging was also opportunistically observed in cropped paddocks of canola and lupin, and on wild radish as weed species (Figure O). Night roost evidence was recorded at six separate locations within or near the Project Area (Figure N), and a roost location to the north of the Waddi Bush Resort is suspected. Nesting was observed in one tree on Minyulo Brook with one pair successfully raising a chick outside the Project Area (Figure N). There were several Wandoo and Marri trees with chewed hollows consistent with nesting Black-Cockatoos along Minyulo Brook and in woodland north of Waddi Road

MNES	EPBC Act listing status	Type of presence	Likelihood of occurrence within the Project Area
Mammals			
<i>Bettongia penicillata ogilbyi</i> (woylie)	Endangered	Species or species habitat likely to occur within area (In buffer area only)	Highly unlikely - The remnant sub-populations in south-western Australia are found in woodlands and adjacent heaths with a dense understorey of shrubs (TSSC 2018b). They rest during the day in hidden nests built over a shallow depression - The Protected Matters Search Tool results identified species or species habitat likely to occur at the Nambung National Park, which is located approximately 22 km west of the Project Area (TSSC 2018 and Landgate 2025). The woylie population was a trial translocation to the Nambung National Park that did not successfully establish (DEE 2018a). Woylie population estimates at Nambung National Park were 50 (0-100) in 2006 and dropped to 0 (0-50) in 2010 (TSSC 2018). The reintroduced woylie population at Nambung Park has likely become functionally extinct at this location - There are no records of woylie in DBCA’s database within a 25 km radius of the Project Area. There are no Atlas of Living Australia occurrence records of woylie proximate to the Project Area, with the nearest record located approximately 150 km to the southeast (Atlas of Living Australia 2025c) - This species has not been recorded during fauna site surveys of the Project Area (RPS 2014) or during opportunistic fauna observations (Ecologia Environment 2016). This species is highly unlikely to occur within the Project Area as it is removed from known woylie subpopulation locations within Western Australia (DEE 2018a) and is likely to be locally extinct in the locality of the proposed wind farm
<i>Dasyurus geoffroii</i> (chuditch)	Vulnerable	Species or species habitat likely to occur within area (In feature area)	Unlikely - The chuditch uses a variety of habitats, including forest, mallee shrublands, woodland and desert. The majority of the naturally occurring populations of this species are found in jarrah (<i>Eucalyptus marginata</i>) forests and woodlands in the south-west of Western Australia, and in woodlands, mallee shrublands and heaths along the south coast. There have been occasional records of the chuditch in drier woodland and mallee shrubland in the Wheatbelt and Goldfield regions. The chuditch requires a suitable number of den and refuge sites (i.e. horizontal hollow logs or earth burrows) and sufficient prey biomass. The chuditch’s estimated home range for males is over 15 km² and for females is 3–4 km². They can travel large distances in their large home ranges and even at their most abundant, they are generally present in low numbers. This is why they require habitats of a suitable size, and which are not excessively fragmented (DEC 2012a) - The Project Area is significantly removed from where the majority of chuditch populations are known to occur in the eucalypt forests and woodlands, and mallee heath and shrublands of the south-west and south coast of Western Australia (DEC 2012a). The Project Area is in the western extent of the Wheatbelt region and there is a scarcity of occurrence records of this species in the Project Area’s wider locality (Atlas of Living Australia 2024c). The nearest chuditch records proximate to the Project Area include an opportunistic sighting on 31 May 1987 from DBCA’s database located approximately 20 km to the south, one individual recorded on 12 June 1996 located approximately 40 km to the east (road kill observed in Moora), one individual recorded in 1967 located approximately 80 km to the south-east (near the Udumung Nature Reserve) and one individual recorded in 1975 located approximately 85 km to the south-east (near Moondah) (Atlas of Living Australia 2024c). This species has not been identified as a mammal species that may occur in similar nearby habitat within the Project Area or recorded in studies conducted in the nearby Cooljarloo and Falcon areas (in the Dasyuridae family) (RPS 2014). Chuditch has not been detected during fauna surveys undertaken for the wind farm (Ecological Environment 2016, RPS 2014) - Native vegetation types mapped within the Project Area include Proteaceous scrub heath, Banksia Low Open Woodland, <i>Melaleuca</i> Low Open Woodland, <i>Eucalyptus tottiana</i> Woodland and <i>Corymbia calophylla</i> Woodland. Woodland and scrub heath vegetation could provide potentially suitable habitat for dispersal or foraging, however native vegetation within the Project Area is fragmented by areas cleared for agricultural land uses. The fragmented nature of native vegetation in the Project Area and its surroundings would make it difficult for the chuditch to persist in the Project Area considering the home range of the chuditch, particularly the males. Furthermore, the records of chuditch proximate to the Project Area are historical (27 years to 56 years old) and located 20 km or greater distances from the Project Area. As such, this species is unlikely to occur within the Project Area due to the scarcity and age of Wheatbelt records and highly fragmented nature of native vegetation patches in the Project Area
<i>Macroderma gigas</i> (ghost bat)	Vulnerable	Species or species habitat may occur within area (In feature area)	Highly unlikely - The ghost bat is found in habitats ranging from the arid Pilbara to tropical savanna woodlands and rainforests. During the daytime, they roost in rock crevices, old mines, and caves. Within Western Australia, ghost bats occur in the Kimberley and the Pilbara regions (TSSC 2016) - A bat survey was undertaken over two separate periods (between October and November 2008 and in May 2009) with detectors at six locations across the Project Area to detect and record passing bats as they echolocate to navigate and find prey (RPS 2014). The detectors were positioned in locations near the proposed wind turbines and either near or between features known to be used by bats such as linear features (e.g. tree line wind breaks), native vegetation, woodland stands or water bodies. All five bat species detected near the proposed turbine locations are fairly common and they have been previously detected during bat surveys for other wind farm developments in the region. No bat species of conservation significance were detected (i.e. ghost bat) (RPS 2014) - The Project Area is located within the Wheatbelt region of Western Australia, where populations of ghost bats are not expected to occur, and there is no roosting habitat present within the Project Area (i.e. rock crevices, old mines, and caves). As such, this species is highly unlikely to occur within the Project Area due to its known areas of distribution in Western Australia and the absence of suitable habitat within the Project Area and the wider locality
<i>Parantechinus apicalis</i> (dibbler)	Endangered	Species or species habitat may occur within area (In feature area)	Highly unlikely - The dibbler is currently restricted to the Western Australian coastline near Jurien on three small offshore islands, Boullanger, Whitlock and Escape islands, and a small number of widely scattered mainland sites along the south coast. The dibbler can occupy a diverse range of habitats, seeming to prefer vegetation with a dense canopy greater than 1 m high that is unburnt for at least ten years or more. In some locations, the presence of Proteaceous and Myrtaceous flowering shrubs may also be important. Mainland habitat is characterised by the presence of long unburnt heathland that is typified by sandy substrates and occasionally lateritic soils (DCCEEW 2024m) - There are no records of the dibbler in DBCA’s database within a 25 km radius of the Project Area - The dibbler only occurs in Western Australia, with its distribution within conservation reserves (DCCEEW 2024m). In mainland Western Australia, irregular collections of the dibbler have occurred at the Fitzgerald River National Park, which is 100 km north-west of Albany. Given that this species has a history of disappearances and rediscoveries, the dibbler may be present in other Western Australian locations including western coastal areas between Lancelin and Dongara and more likely the south coast between Denmark and Israelite Bay (TSSC 2015)

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MNES	EPBC Act listing status	Type of presence	Likelihood of occurrence within the Project Area
			This species has not been recorded during fauna site surveys of the Project Area (RPS 2014) or during opportunistic fauna observations (Ecologia Environment 2016). As this species is restricted to offshore islands in this region, and the only mainland population is found on Western Australia’s south coast, it is highly unlikely to occur in the Project Area
Reptile			
<i>Egernia stokesii badia</i> (western spiny-tailed skink)	Endangered	Species or species habitat may occur within area (In feature area)	Highly unlikely - The western spiny-tailed skink occurs between Shark Bay and Minnivale in the Wheatbelt region of Western Australia and includes a population on Baudin Island within Shark Bay. Most records of this species were found in York Gum (<i>Eucalyptus loxophleba</i>) woodland, with some records found in Gimlet (<i>Eucalyptus salubris</i>) and Salmon Gum (<i>Eucalyptus salmonophloia</i>) woodland. Populations persist in woodland patches as small as 1 ha and surrounded by wheatfields. Greater numbers of individuals were located at sites with numerous logs and subjected to low intensity grazing by domestic stock (DCCEEW 2024n) - There are no records of the western spiny-tailed skink in DBCA’s database within a 25 km radius of the Project Area - This species has not been identified as a reptile species that may occur in similar nearby habitat within the Project Area’s vicinity or recorded in studies conducted in the nearby Cooljarloo and Falcon areas (in the Scincidae family) (RPS 2014). Flora and vegetation surveys of the native vegetation within the Project Area have not identified York Gum, Gimlet or Salmon Gum woodlands (RPS 2023; Ecologia Environment 2016; Outback Ecology 2014; Outback Ecology 2010). This species is highly unlikely to occur within the Project Area due to the absence of suitable habitat

4.6 Topography

The topography of the Project Area ranges from approximately 120 m Australian Height Datum (m AHD) at the south-western boundary to 240 m AHD at its northern and eastern boundary, based on the Wedge Island 1:100 000 topographical map (Geoscience Australia 2001) and Dandaragan 1:100 000 topographical map (Geoscience Australia 1976). The site is characterised by undulating hills and shallow flat-bottomed valleys containing some remnant vegetation and ephemeral watercourses (Figure P).

4.7 Soil

The Department of Primary Industries and Regional Development (DPIRD) soil landscape mapping shows four soil systems across the Project Area, including the:

- Yerramullah system
 - The Yerramullah system is characterised by subdued dissected lateritic plateau, undulating low hills and rises on laterised weathered sandstone. Pale deep sand, sandy gravels and yellow deep sand predominate. This system is associated with the wind turbines and most of the transmission line alignment
- Nylagarda system
 - The Nylagarda system is characterised by alluvial plains and terraces of the Hill River and major creeks of the north coastal plain. Brown deep sands and brown sandy earths predominate, with minor pale deep sand and saline wet soil. This system is associated with Mullering Brook
- Bassendean system
 - The Bassendean system is characterised by sand dunes and sandplains with pale deep sand, semi-wet and wet soil. This system is associated with the westernmost extent of the transmission line alignment
- Boothendarra system
 - The Boothendarra system is characterised by a narrow band of sandy and gravelly duplexes, often found on subdued stripped lateritic plateaus. This system is associated with the far east of the Project Area within which no wind farm or transmission line infrastructure is proposed

The DPIRD soil landscape mapping is presented in Figure Q relative to the Project Area.

4.8 Hydrology

4.8.1 Groundwater

The Project Area is situated within the Badgingarra groundwater sub-area of the Jurien groundwater area and the Wedge Island and Cataby Confined groundwater sub-areas of the Gingin groundwater area, which are proclaimed under the Western Australian *Rights in Water and Irrigation Act 1914* (Landgate 2025). The northern Jurien groundwater area extends over approximately 501,200 ha and encompasses eight unconfined and confined (including semi-confined) aquifers or groundwater resources (Department of Water 2010). In the northern Jurien groundwater area, the Project Area is underlain by the unconfined Superficial aquifer and the confined Yarragadee aquifer. Groundwater quality ranges from fresh to brackish in the Superficial aquifer and from fresh to marginal, and locally brackish, in the Yarragadee aquifer. The southern Gingin groundwater area extends over approximately 600,000 ha and encompasses nine unconfined and confined (including semi-confined) aquifers (Department of Water 2015). In the southern Gingin groundwater area, the Project Area is also underlain by the unconfined Superficial aquifer and the confined Yarragadee aquifer. Groundwater quality in the Superficial aquifer is generally fresh, and in the Yarragadee aquifer it is generally fresh however high salinity occurs along the Darling Fault.

There are four groundwater licences (101017, 104551, 157540, 159548) held by Tronox to extract groundwater from the Superficial and Yarragadee aquifers, which overlap the south-western extent of the Project Area close to the Cataby substation (DWER 2025a). There is one groundwater licence (206081) held by Strike Energy Limited to extract groundwater from the Superficial aquifer and one groundwater licence

(210971) held by Strike South West Pty Ltd to extract groundwater from the Yarragadee aquifer, which overlap the western extent of the Project Area.

There are no Public Drinking Water Source Areas (PDWSA) within the Project Area, and the closest is the Dandaragan Water Reserve Priority 3 PDWSA located approximately 15 km to the east (Landgate 2025).

4.8.2 Surface water

The Project Area is characterised by undulating hills with ephemeral to semi-permanent drainage lines in gullies and valleys (RPS 2014). Mullering Brook is a significant stream, which intersects the Project Area and another significant stream, Minyulo Brook, flows to the south of the Project Area (Landgate 2025). The river condition of Mullering Brook was assessed twice as part of the Healthy Rivers Program in October 2008 and October 2021 at locations approximately 750 m south of the Project Area. The two samples had an average pH of 7.06 and an average salinity of 7,802 uS/cm electrical conductivity, which is indicative of neutral and brackish water (DWER 2025b).

The Project Area is also surrounded by numerous farm dams and wetlands (Landgate 2025). A portion of the Mullering Brook has been mapped as flood plain wetland in the Geomorphic Wetlands Cervantes South data set. The closest wetland of importance is the Lancelin Defence Training Area wetland, located approximately 4 km south-west of the Project Area and listed on the Directory of Important Wetlands in Australia – Western Australia. It is approximately 2,000 ha in size, is comprised of coastal zone and inland wetland types and meets two of the six criteria for determining important wetlands (Environment Australia 2001).

The surface water features are mapped in relation to the Project Area in Figure R.

4.9 Aboriginal cultural heritage

The Proposed Action is located within the Yued Indigenous Land Use Agreement (ILUA) area (DPLH 2024). The Proponent acknowledges the Yued Noongar people as the Traditional Owners of all land encompassing the Project Area.

Preliminary engagement between Wind Prospect and the Yued traditional owners commenced in 2008 and is now primarily led through the Yued Aboriginal Corporation with support from the South West Aboriginal Land and Sea Council (SWALSC).

Several Aboriginal cultural heritage investigations have been undertaken in collaboration with SWALSC and the Yued Aboriginal Corporation over the course of development of the Proposed Action. Those investigations include:

- Report of an Aboriginal Heritage Survey of the Proposed Waddi & Yandin Wind Farms in the Shire of Dandaragan, Western Australia, prepared for Wind Prospect Pty Ltd (Goode and Harris 2012)
- Addendum Report of an Aboriginal Heritage Survey of the Proposed Waddi & Yandin Wind Farms in the Shire of Dandaragan, Western Australia, prepared for Wind Prospect Pty Ltd (Goode and Harris 2016)
- Addendum Report of an Aboriginal Heritage Survey of the Proposed Waddi Renewable Energy Project Shire of Dandaragan, Western Australia, prepared for Tilt Renewables (Bennetts and Corsini 2022)
- Report of an Aboriginal Heritage Survey of Proposed Waddi Wind Farm Additional Survey Areas 1-5, near Cataby in Shire of Dandaragan, Western Australia, prepared for Tilt Renewables Pty Ltd (Chown and Johnston 2023)

The heritage investigations have identified several Aboriginal cultural heritage sites in proximity to the Proposed Action, including one Registered Aboriginal Heritage Place (ID 4640; Mullering Brook), a Mythological Aboriginal heritage site, within the Project Area (Figure S). A number of Moodjar trees (*Nuytsia floribunda*) are also known to be located in the Project Area. Although these trees are not registered under the *Aboriginal Heritage Act 1972* they are known to hold significance to many Yued Noongar as an important cultural marker.

The Billinue Aboriginal Community is located to the south of the Project Area, west of the Brand Highway (Figure S).

Impacts to all Aboriginal heritage sites and places registered under the *Aboriginal Heritage Act 1972* have been avoided following engagement with the SWALSC and Yued Aboriginal Corporation. Avoidance mechanisms have included:

- Revisions to the proposed transmission line design to avoid the need for transmission poles or other ground disturbing infrastructure within Aboriginal Cultural Heritage Place (ID 4640; Mullering Brook).
- Amendments to the construction methodology and Disturbance Footprint to avoid the need for an access track and associated vegetation clearance within Aboriginal Cultural Heritage Place (ID 4640; Mullering Brook).

The proposed transmission line will pass over Aboriginal Cultural Heritage Place (ID 4640; Mullering Brook) without the need for ground disturbance. During construction and maintenance of the transmission line, the canopies of some marri trees proximate to Mullering Brook may require trimming to maintain a clearance distance of 7.5 m from the transmission line within the mapped Aboriginal Cultural Heritage Place. Trimming works are not expected to adversely harm these trees.

The Proponent and the Yued Aboriginal Corporation have entered into a co-designed Cultural Heritage Management Plan (CHMP) to govern construction of the Proposed Action, potential impacts to Moodjar trees, and accidental discoveries of Aboriginal cultural heritage sites or places.

5 MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

5.1 Overview

The threatened species, threatened ecological community and migratory birds identified by DCCEEW that could potentially be impacted by the Proposed Action, because of habitat clearance, habitat fragmentation, and through turbine and transmission line collision and barotrauma, and for which potential impacts have accordingly been assessed for significance against relevant guidelines, are:

- Listed threatened species and community:
 - Carnaby's cockatoo (*Zanda latirostris*) (Endangered)
 - Curlew sandpiper (*Calidris ferruginea*) (Critically Endangered)
 - Sharp-tailed sandpiper (*Calidris acuminata*) (Vulnerable)
 - Banksia woodlands of the Swan Coastal Plain TEC (Endangered)
 - Star sun-orchid (*Thelymitra stellata*) (Endangered)
 - Dwarf green kangaroo paw (*Anigozanthos viridis* subsp. *terraspectans*) (Vulnerable)
 - Lesueur hakea (*Hakea megalosperma*) (Vulnerable)
 - Sandplain duck orchid (*Caleana dixonii*) (Endangered)
 - Glossy-leafed hammer orchid (*Drakaea elastica*) (Endangered).
- Migratory bird species:
 - Curlew sandpiper (*Calidris ferruginea*) (Migratory)
 - Fork-tailed swift (*Apus pacificus*) (Migratory)
 - Sharp-tailed sandpiper (*Calidris acuminata*) (Migratory)
 - Pectoral sandpiper (*Calidris melanotos*) (Migratory)
 - Common sandpiper (*Actitis hypoleucos*) (Migratory).

A Protected Matters Search Tool report was generated for the Proposed Action in February 2025 as part of preparing the Preliminary Documentation (DCCEEW 2025a; Appendix S). Seven new threatened species and two TECs were identified in the 2025 Protected Matters Search Tool report when compared to the Protected Matters Search Tool report that underpinned the 2023 EPBC Act referral:

- Listed threatened species:
 - Sharp-tailed sandpiper (*Calidris acuminata*). This species was identified as a Migratory species in the previous Protected Matters Search Tool that accompanied the 2023 EPBC Act referral. DCCEEW considered potential impacts to this species as part of reviewing the 2023 EPBC Act referral and requested additional information on this species to inform its assessment. Potential impacts to this species from the Proposed Action have been assessed in detail as part of this Preliminary Documentation (see Section 5.2.1)
 - Common greenshank (*Tringa nebularia*). This species was identified as a Migratory species in the previous Protected Matters Search Tool that accompanied the 2023 EPBC Act referral. DCCEEW considered potential impacts to this species as part of reviewing the 2023 EPBC Act referral and did not request additional information on this species to inform its assessment. There are no wetland or coastal habitats for the common greenshank within or proximate to the Project Area. The local transiting movements and flight paths of migratory species between regional wetland environments has been identified as generally following a north to south alignment of drainage basins and coastal wetlands. East to west movements through the local Dandaragan landscape are anticipated to follow the open water habitats through the Moore River catchments. Therefore, it is unlikely that common greenshanks will be placed at significant risk of adverse impact due to the construction and operation of the Proposed Action

- Woylie (*Bettongia penicillata ogilbyi*). This fauna species is identified as an Endangered species. The likelihood of occurrence for this species within the Project Area was assessed in Table 12 and was found to be highly unlikely to occur. Therefore, potential impacts to this species are not assessed further in the Preliminary Documentation
- Wilson's Wattle (*Acacia wilsonii*). This flora species is identified as Endangered. The likelihood of occurrence for this species within the Project Area was assessed in Table 8 and was found to be unlikely to occur. Therefore, potential impacts to this species are not assessed further in the Preliminary Documentation
- Dark-bract Banksia (*Banksia fuscobracteata*). This flora species is identified as Critically Endangered. The likelihood of occurrence for this species within the Project Area was assessed in Table 8 and was found to be unlikely to occur. Therefore, potential impacts to this species are not assessed further in the Preliminary Documentation
- Midlands Gum (*Eucalyptus pruiniramis*). This flora species is identified as Endangered. The likelihood of occurrence for this species within the Project Area was assessed in Table 8 and was found to be unlikely to occur. Therefore, potential impacts to this species are not assessed further in the Preliminary Documentation
- Mount Lesueur Mallee (*Eucalyptus suberea*). This flora species is identified as Vulnerable. The likelihood of occurrence for this species within the Project Area was assessed in Table 8 and was found to be unlikely to occur. Therefore, potential impacts to this species are not assessed further in the Preliminary Documentation
- Listed threatened ecological communities:
 - Honeymyrtle shrubland on limestone ridges of the Swan Coastal Plain Bioregion. This TEC is identified as Critically Endangered. No vegetation types or soil landscape types analogous with this community have been described by any of the vegetation surveys (RPS 2023; Ecologia Environment 2016; Outback Ecology 2014; Outback Ecology 2010). The likelihood of occurrence for this TEC within the Project Area is assessed in Table 10 and was found to be highly unlikely to occur. Therefore, potential impacts to this species are not assessed further in the Preliminary Documentation
 - Clay Pans of the Swan Coastal Plain. This TEC is identified as Critically Endangered. No vegetation types or soil landscape types analogous with this community have been described by any of the vegetation surveys (RPS 2023; Ecologia Environment 2016; Outback Ecology 2014; Outback Ecology 2010). The likelihood of occurrence for this species within the Project Area is assessed in Table 10 and was found to be highly unlikely to occur. Therefore, potential impacts to this TEC are not assessed further in the Preliminary Documentation

The following subsections provide additional information on each of the Commonwealth EPBC Act listed threatened species, threatened community and migratory birds that could potentially be impacted by the Proposed Action.

5.2 Additional information on listed threatened bird species and listed migratory species

5.2.1 Four sandpiper species

Information requested by DCCEE in relation to the EPBC Act listed sandpiper species raise similar considerations. Additional information in relation to each of the sandpiper species is outlined in the subsections below.

5.2.1.1 Habitat assessment

5.2.1.1.1 Curlew sandpiper

The curlew sandpiper is listed as Critically Endangered and Migratory under the EPBC Act. It is a small-to-medium migratory wader measuring 18 to 23 centimetres (cm) long, roughly 57 grams and with a wingspan of 38 to 41 cm. There is a slight difference between breeding and non-breeding plumages.

Key threats to the curlew sandpiper include:

- Loss of feeding and roosting habitat
- Fragmentation or isolation of sites within feeding areas resulting in decreasing abundance
- Human disturbance at roost and feeding sites
- Disturbance by dogs at roost and feeding sites
- Pollution.

Migration patterns for the curlew sandpiper include moving south from their primary breeding ground in Siberia to various non-breeding areas south of 35th parallel between July and August, and a return to breeding grounds beginning in March (BirdLife International 2024b).

Habitat for the curlew sandpiper has been defined in Conservation Advice for *Calidris ferruginea* (curlew sandpiper) (DCCEEW 2024e) as “coastal and sub-coastal plains from Cape Arid to south-west Kimberley” and “occasionally they occur inland, in areas south of 26th parallel” (DCCEEW 2024e). The species mainly occurs on intertidal mudflats in sheltered coastal areas, including estuaries, bays, inlets, lagoons and non-tidal swamps, lakes and lagoons and around ephemeral and permanent lakes (DCCEEW 2024e), with large populations observed at Port Hedland Saltworks, Eighty-mile beach, Roebuck Bay and Lake Macleod.

The curlew sandpiper primarily forages on mudflats and nearby shallow water, non-tidal wetlands where they wade in water predominantly 15–30 mm deep and up to 60 mm, at the edge of shallow pools, intertidal mudflats, sandy shores and at low sparse emergent vegetation during high tide. In more prominent areas of Western Australia, such as Roebuck Bay, they will follow the receding tide whilst also feeding on exposed mudflats. This species forages mainly on invertebrates, including worms, molluscs, crustaceans, and insects, as well as seeds. Outside Australia, they also forage on shrimp, crabs and small fish (DCCEEW 2024e).

Curlew sandpipers roost in open situations with damp substrate, especially on bare shingle, shell or sand beaches, sandspits and islets in or around coastal or near-coastal lagoons and other wetlands, occasionally roosting in dunes during very high tides and sometimes in saltmarsh (Higgins and Davies 1996).

5.2.1.1.2 Sharp-tailed sandpiper

The sharp-tailed sandpiper is currently listed as Vulnerable and Migratory under the EPBC Act. It is a small-to-medium migratory wader measuring 17 to 22 cm long, roughly 65 grams and a wingspan of 36 to 43 cm, with slight difference between breeding and non-breeding plumages.

Key threats to the sharp-tailed sandpiper include:

- Habitat loss
- Habitat degradation
- Direct mortality (e.g. construction of wind farms in migration or movement pathways, bird strike due to aircraft, hunting, chemical and oil spills).

Migration patterns for the sharp-tailed sandpiper include moving south from their primary breeding ground in northern Siberia to various non-breeding areas south of 35th parallel, arriving in Australia in small numbers in mid-August and larger numbers in early September, and a return to breeding grounds beginning in April (DCCEEW 2024c).

No critical habitat for the sharp-tailed sandpiper has been defined in Conservation Advice for *Calidris acuminata* (sharp-tailed sandpiper) due the species being more flexible in their habitat choice than most shorebird species during the non-breeding season (DCCEEW 2024c). The species mainly occurs along coasts and within inland wetlands – from fresh to hypersaline. Sharp-tailed sandpipers are also more tolerant of grassy vegetation than most shorebirds. They tend to occupy coastal mudflats mainly after ephemeral terrestrial wetlands have dried out, moving back during the wet season. The highest density of the species can be found around grassy edges of shallow inland freshwater wetlands. It is also found around sewage farms, flooded fields, mudflats, mangroves, rocky shores, and beaches (DCCEEW 2024c).

The sharp-tailed sandpiper primarily forages edge of the water of wetlands or intertidal mudflats, either on bare wet mud or sand, or in shallow water. They also forage among inundated vegetation of saltmarsh, grass or sedges. They forage in sewage ponds, and often in hypersaline environments. After rain, they may forage in paddocks of short grass, well away from water. They may forage on coastal mudflats at low tide and move

to freshwater wetlands near the coast to feed at high tide. Occasionally they forage on wet or dry mats of algae and among rotting beach cast seagrass or seaweed, and sometimes they are recorded foraging around the edges of stony wetlands or among rocks in water, and rarely on exposed reef (Higgins and Davies 1996).

This species is omnivorous and forages on seeds, worms, molluscs, crustaceans and insects and plant seeds including *Paspalum* spp., clover (*Trifolium* spp.), *Medicago* sp., Lucerne (*Medicago sativa*), *Ruppia* spp., goosefoot (*Chenopodium* spp.) and knotweed (*Polygonum* spp.). They ingest grit, sand and charcoal. They are also reported to eat arachnids and dead fish (Higgins and Davies 1996).

Sharp-tailed sandpipers roost at the edges of wetlands, on wet open mud or sand, in shallow water, or in short sparse vegetation, such as grass or saltmarsh. Occasionally, they roost on sandy beaches, stony shores or on rocks in water (Higgins and Davies 1996).

5.2.1.1.3 Pectoral sandpiper

The pectoral sandpiper is listed as Migratory under the EPBC Act. It is a small-to-medium migratory wader measuring 19 to 24 cm long, roughly 85 grams for males and 60 grams for females with a wingspan of 37 to 45 cm.

Key threats to the pectoral sandpiper include:

- Habitat loss
- Habitat degradation
- Disturbance
- Direct mortality (e.g. construction of wind farms in migration or movement pathways, bird strike due to aircraft, hunting, chemical and oil spills).

Pectoral sandpiper are uncommon migrants to Australia, typically arriving in August to September and depart again in March to April. (BirdLife Australia 2024d). Habitat for the pectoral sandpiper has been defined as shallow fresh to saline wetlands. The species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, flood plains and artificial wetlands and occasionally further inland (DCCEEW 2024f). In Western Australia, the species, despite being uncommon, has been observed at the Nullarbor Plain, Reid, Stoke's Inlet, Grassmere Lake, Warden Lake, Dalyup and Yellilup Swamp, Swan River, Bengier Swamp, Lake Guraga, Wittecarra, Harding River, coastal Gascoyne, the Pilbara and the Kimberley (Higgins and Davies 1996). The pectoral sandpiper is omnivorous, consuming algae, seeds, crustaceans, arachnids and insects and forages in shallow water or soft mud at the edge of wetlands.

5.2.1.1.4 Common sandpiper

The common sandpiper is listed as Migratory under the EPBC Act. It is a small-to-medium migratory wader measuring 19 to 21 cm long and a wingspan of 32 to 35 cm.

Key threats to the common sandpiper include:

- Human activities
- Habitat loss
- Reduction of quality and quantity of water
- Global warming.

The common sandpiper inhabits coastal wetlands and some inland wetlands and is mostly found around muddy margins or rocky shores and rarely on mudflats. The common sandpiper has been recorded in estuaries and deltas of streams, as well as on banks farther upstream; around lakes, pools, billabongs, reservoirs, dams and claypans, and occasionally piers and jetties. The muddy margins utilised by the species are often narrow and may be steep. The species is often associated with mangroves and sometimes found in areas of mud littered with rocks or snags (DCCEEW 2024a).

The common sandpiper primarily forages on shallow water and on bare soft mud at the edges of wetlands; often where obstacles project from substrate, e.g. rocks or mangrove roots and sometimes venture into

grassy areas adjoining wetlands (Higgins and Davies 1996). The species is typically carnivorous and eats molluscs such as bivalves, crustaceans such as amphipods and crabs and a variety of insects.

The common sandpipers roost sites are typically on rocks or in roots or branches of vegetation, especially mangroves. The species is known to perch on posts, jetties, moored boats and other artificial structures, and to sometimes rest on mud or 'loaf' on rocks (DCCEEW 2024a).

5.2.1.2 Project Area consideration

The EPBC Act Protected Matters Report identifies that the species or species habitat may occur within the Project Area for the four sandpiper species detailed in Section 5.2.1.1.1 to 5.2.1.1.4 (Appendix S). The Project Area is situated approximately 50 km from the coast and characterised by a variety of habitats but is primarily cleared agricultural land with remnant patches of native vegetation, with the local area exhibiting ephemeral and semi-permanent drainage lines (i.e. Mullering Brook) along the undulating gullies and valleys (RPS 2010a). The five key habitat types occurring within the Project Area are:

- Open pasture / cultivation area, often with scattered trees
- Remnant heathland vegetation
- Woodland remnants / elements
- Areas where various combinations of heathland and/ or woodland are associated with areas dominated by open pasture / cultivation habitats
- Aerial habitats above land for avifauna.

These habitat types do not align with the curlew sandpiper's preferred coastal and lake habitats, sharp-tailed sandpiper's preferred coastal and wetland habitats, pectoral sandpiper's preferred coastal and wetland habitats and common sandpiper's preferred wetland habitat. Figure K illustrates potential migratory wader habitat within a 12 km radius of the Project Area, informed by mapped regional surface water features.

Water sources within the Project Area include Mullering Brook and farm dams (Figure K):

- Mullering Brook is a tributary of Hill River and is recharged by surface water flows and groundwater (DWER 2018). Mullering Brook receives groundwater discharge from the confined Yarragadee aquifer as baseflow, springs and pools upstream of the Project Area and from the unconfined superficial aquifer found along the Mullering Brook valley (Department of Water 2017). Limited sampling along Mullering Brook in 2008 and 2021 identified an average pH of 7.06 and an average salinity of 7,802 uS/cm electrical conductivity, which is indicative of neutral and brackish water (DWER 2025b). The typical salinity of freshwater is 0 – 1,500 uS/cm. Water in the Mullering Brook is seasonally dependent on rainfall and shallow groundwater levels and its water quality may not always be fresh.
- Farm dams are recharged by surface water flows and potentially by groundwater.

The Mullering Brook and farm dams do not comprise suitable water sources for the four sandpiper species, due to the semi-permanent availability of water, the variable water quality (high salinity) and that the water sources are in a disturbed agricultural setting. Therefore, the water sources provide limited to negligible foraging values compared to the curlew sandpiper's preferred coastal and lake habitats, sharp-tailed sandpiper's preferred coastal and wetland habitats, pectoral sandpiper's preferred coastal and wetland habitats and common sandpiper's preferred wetland habitat.

The four sandpiper species were not recorded within the Project Area by the DBCA's Threatened and Priority Fauna database, BirdLife Australia's Birddata database (BirdLife Australia 2024a), Ebird's species observations (Ebird Database 2024), Atlas of Living Australia's database (Atlas of Living Australia 2025d) or the 16 bird census sites established within the Waddi Wind Farm by RPS (2010a).

The targeted avifauna field surveys were undertaken by experienced bird ecologists in two separate survey periods, from 29 October to 7 November 2008 and from 18 to 26 November 2008 inclusive (RPS 2010a). The timing of the surveys coincides with the curlew sandpiper's southern migration (i.e. between July–August and March) (DCCEEW 2024e), sharp-tailed sandpiper's southern migration (i.e. between mid-August and April) (DCCEEW 2024c), pectoral sandpiper's southern migration (i.e. between August and April) (DCCEEW 2024f) and common sandpiper's southern migration (i.e. between July–November to early-June) (DCCEEW 2024a). Hence it is reasonable to expect that the four sandpiper species would likely have been detected by RPS (2010a) if seasonally present. Given that the curlew sandpiper's preferred coastal and lake habitats, sharp-tailed sandpiper's preferred coastal and wetland habitats, pectoral sandpiper's preferred

coastal and wetland habitats and common sandpiper's preferred wetland habitat are not present within the Project Area, it is unlikely to expect that the four sandpiper species would be present within the Project Area.

Further, the four sandpiper species were not recorded within 20 bird census sites established within Yandin Wind Farm or the seven representative plots outside of the wind farm sites by RPS (2010a), nor was the species recorded by avian surveys and mortality and abundance monitoring (Ecoscape 2018, Ecoscape 2019a, Ecoscape 2019b and Ecoscape 2020) at the Badgingarra Wind Farm, located approximately 28 km north-west of the Project Area. The four sandpiper species were also not recorded by either the pre-development avian survey (Ecologia Environment 2017) or the monthly carcass searches (Alinta Energy 2022; Alinta Energy 2024) undertaken at the Yandin Wind Farm approximately 10 to 25 km south-east of the Waddi Wind Farm. This is due to a lack of suitable coastal, lake and wetland habitats at these sites. Additionally, the Ecologia Environment (2017) avifauna assessment undertaken for the Yandin Wind Farm confirmed that the avian fauna assemblage remained unchanged from the earlier RPS (2010a) study at the Yandin Wind Farm.

The surveys conducted for the Badgingarra Wind Farm were undertaken in October, December, February, and April (Ecoscape 2018, Ecoscape 2019a, Ecoscape 2019b and Ecoscape 2020), whilst the surveys conducted for the Yandin Wind Farm were undertaken in September and from December to November (Ecologia Environment 2017; Alinta Energy 2022; Alinta Energy 2024). These survey periods correlate to periods where the four sandpiper species are expected to be present in Western Australia, such as curlew sandpiper's southern migration (i.e. between July–August and March) (DCCEEW 2024e), sharp-tailed sandpiper's southern migration (i.e. between mid-August and April) (DCCEEW 2024c), pectoral sandpiper's southern migration (i.e. between August and April) (DCCEEW 2024f) and common sandpiper's southern migration (i.e. between July–November to early-June) (DCCEEW 2024a). The survey periods also correlate with the time of the year (i.e. spring to early summer) which maximises the opportunity for open water to be present in any seasonally dependent wetland environments. It is therefore reasonable to expect the four sandpiper species would have been detected at the time of the surveys (if seasonally present).

Informed by the findings of the DBCA's Threatened and Priority Fauna database, BirdLife Australia's Birddata database (BirdLife Australia 2024a), Ebird's species observations (Ebird Database 2024), Atlas of Living Australia's database (Atlas of Living Australia 2025d), RPS (2010a) avifauna assessment and the assessments undertaken for the neighbouring wind farms (Ecologia Environment 2017; Alinta Energy 2022; Alinta Energy 2024; Ecoscape 2018, Ecoscape 2019a, Ecoscape 2019b and Ecoscape 2020), and acknowledging a lack of habitat within the Project Area for this species, the curlew sandpiper, sharp-tailed sandpiper, pectoral sandpiper and common sandpiper are considered extremely unlikely to be seasonally present within the Project Area.

5.2.1.3 Regional wetland habitats

Several migratory wading bird species were recorded from wetland habitats around Lake Guraga to the south-west, the near coastal Lake Thetis near Cervantes and from the Upper Moore River area to the north-west and west of Moora. This included 23 observations of sharp-tailed sandpiper at the upper Moore River catchment near Moora (RPS 2010a), which is located approximately 40 km east of the Project Area.

There are few wetlands apart from farm dams in the vicinity of the Project Area, although a small lake occurs some 10 km to the east of the wind farm at Aggies Cottage on Badgingarra Road. However, there are a number of relatively large water bodies to the south-west (approximately 18 km from the Project Area), small to moderate sized water bodies to the east near Dandaragan (approximately 10 km from Project Area), a considerable number of water bodies in the upper Moore River catchment near Moora (approximately 37 km east from the Project Area) and a number of large water bodies further west near Wongan Hills including Lake Hinds (approximately 120 km from the Project Area) and Lake Ninan (approximately 130 km from the Project Area).

Records of the four sandpiper species in DBCA's database within a 25 km radius of the Project Area include:

- Curlew sandpiper (2 records)
 - One record was associated with the lake north-east of Lake Guraga, over 20 km south of the Project Area, and another record was identified approximately 2.4 km to the west of the Project Area
- Sharp-tailed sandpiper (2 records)

- Two records were associated with the lake north-east of Lake Guraga, over 20 km south of the Project Area
- Pectoral sandpiper (0 records)
 - There are no records of pectoral sandpiper in DBCA's database within a 25 km radius of the Project Area
- Common Sandpiper (1 record)
 - One record associated with the lake north-east of Lake Guraga over 20 km to the south of the Project Area (RPS 2010a)

The location of mapped wetland environments, including those of national importance, are presented relative to the Project Area and DBCA records for the four sandpiper species in Figure K. There are no Ramsar wetlands proximate to the Project Area.

Waterbirds associated with the regional wetland habitats were reported by RPS (2010a):

- Lake Guraga and nearby lakes:
 - Lake Guraga occurs to the west of the Brand Highway some 19 km to the south of the Project Area. Two other relatively large water bodies occur nearby including Lake Namming to the south of Lake Guraga and a relatively large water body near to the Brand Highway just north-east of Lake Guraga.
 - During November, when wetland surveys were conducted by RPS (2010a), Lake Guraga was only holding a couple of very shallow crescent shaped ponds and there were approximately 30 red-capped plovers foraging on the lake substrate, the majority of which were away from the small ponds. No other bird species were observed at Lake Guraga. Due to the very shallow substrate profile, it is likely that Lake Guraga would support a range of water bird species when filled, including waterfowl and both migratory and resident wading bird species. The curlew sandpiper, sharp-tailed sandpiper, pectoral sandpiper and common sandpiper were not recorded at this location by RPS (2010a), however the sharp-tailed sandpiper has been identified at this location by the DBCA's database in 1990 and 1991.
 - Namming Lake to the south of Lake Guraga was full during the November waterbird survey. The lake had no shoreline habitat for waders to forage and no migratory or resident wader species were observed. The lake does appear to be an important permanent water body for waterfowl, with musk ducks (approximately 60), blue-billed ducks (approximately 80), Australian shelduck (approximately 500), Australasian shoveler (approximately 150), hoary-headed grebe (40) and a single black swan. Little black (7) and little pied cormorants (1) and a single, yellow-billed spoonbill were also observed. The lake is surrounded by Melaleuca sp. trees, which provided roosting and foraging sites for water birds and may represent breeding sites for those species observed on the lake. The curlew sandpiper and common sandpiper was not recorded at this location by RPS (2010a)
 - The lake to the north-east of Lake Guraga was holding a significant amount of water and due to the shallow substrate profile was found to have significant shoreline habitats at the southern end. Large numbers of water fowl were recorded on this lake, including, Australian shelduck (>1200) and black swan (>400). Other smaller waterfowl were also observed, but observation distances made confident identification difficult. However, numbers of Australasian shoveler (>100), grey teal (60+) and Pacific black duck (2) were observed. Shoreline habitats in the south were supporting both resident and migratory waders including red-capped plover (88), black-winged stilt (35), red-necked avocet (2), common greenshank (1) and red-necked stint (35). Other species closely associated with the lake included silver gull (22), gull-billed tern (1), little egret (1), nankeen night heron (1), straw-necked ibis (70 – roosting), white-bellied sea-eagle (1) and whistling kite (1). The curlew sandpiper was not recorded at this location by RPS (2010a). The common sandpiper was not recorded at this location by RPS (2010a), however has been identified at this location by the DBCA's database
 - Another lake/dam occurring to the south-east of Namming Lake opposite Nammegarra Road's intersection with the Brand Highway was surveyed on several occasions and found to contain fluctuating numbers of Australian shelduck, black-winged stilt, black-fronted dotterel, Australasian shoveler, Pacific black duck and whistling kite were also observed. The curlew sandpiper and common sandpiper was not recorded at this location by RPS (2010a).

- Lake Thetis:
 - Lake Thetis is a saline lake occurring in near coastal dunes to the south-east of Cervantes approximately 37 km west-north-west of the proposed wind farm site. Waterfowl and waders were observed using the lake, including black swan (6), Australian shelduck (>20), Pacific black duck (4), hoary-headed grebe (3), common greenshank (23), common sandpiper (1), Pacific golden plover (4) and red-capped plover (1). The lake was surveyed as representative of several saline lakes occurring in near coastal areas along the coast, particularly to the north of Jurien Bay.
 - The curlew sandpiper, sharp-tailed sandpiper and pectoral sandpiper were not recorded at this location by RPS (2010a), however curlew sandpiper has been identified by Ebird at this location in 2020 (Ebird Database 2024, Atlas of Living Australia 2025d), the sharp-tailed sandpiper has been identified by Ebird at this location in 2000, 2001, 2005, 2007 and 2020 (Ebird Database 2024, Atlas of Living Australia 2025d), the pectoral sandpiper has been recorded at this location in 2009 by BirdLife Australia's Birddata database (BirdLife Australia 2024d). The common sandpiper was recorded at this location by RPS (2010a), and by BirdLife Australia in 1999, 2000, 2001, 2002, 2009, 2016, 2017, 2019, 2020, 2021, 2022 (BirdLife Australia 2024e) and by Ebird's species observations in 2024 (Ebird Database 2024, Atlas of Living Australia 2025d),
- Upper Moore River Catchment near Moora:
 - The upper Moore River catchment near Moora, approximately 37 km east of the Project Area, is represented by broad lowlands traversed by several channels and a string of small to large lakes, some saline in water quality. A number of these lakes, particularly those to the west of Moora and north of Dandaragan Road were holding little water during the survey period and hence were limited in the diversity of waterbirds they were attracting. Relatively large numbers (>100) of red-capped plovers were observed foraging over wet substrate within a largely waterless lake just to the north of the Moora Golf Course. Some lakes further to the north on Coomberdale West Road were holding water; one appeared reasonably permanent with short vegetation around the edges. Several resident and migratory waders were using this lake, including black-winged stilt (96), banded stilt (1), sharp-tailed sandpiper (23) and pectoral sandpiper (1). A larger lake to the south of Coomberdale West Road was only holding about a third of its capacity and there were black-winged stilt (43), red-necked avocet (11) and banded stilts (2) present.
 - The curlew sandpiper and common sandpiper were not recorded at this location by RPS (2010a). The sharp-tailed sandpiper and pectoral sandpiper were recorded at this location by RPS (2010a).
- Aggie's Cottage and Farm Dams:
 - There is a moderately sized dam/lake at Aggie's Cottage to the south-east of the intersection between Wolba Road and Badgingarra Road, which lies approximately 9 km east of the Project Area. The lake is freshwater and used by several waterfowl, including Australian shelduck (4), Pacific black duck (2), grey teal (11), musk duck (2), Australasian shoveler (10), hardhead (6), black swan (1) and hoary-headed grebe (102). Little pied (1) and little black cormorant (1) and black-winged stilt (11) were also observed. A small farm dam approximately 1.2 km to the west of Aggie's Cottage regularly had a pair of Australian shelducks and often up to six grey teal in attendance during the November survey period.
 - The curlew sandpiper, sharp-tailed sandpiper, pectoral sandpiper and common sandpiper were not recorded at this location by RPS (2010a).

5.2.1.4 Transiting and flight paths

Movements of waterbirds associated with the regional wetland habitats were reported by RPS (2010a):

- Lake to the north-east of Lake Guraga:
 - Most movements observed were to and from the lake to the north-east of Lake Guraga. Small groups (<10) of Australian shelducks were noted flying in from the south in the early evening and another couple of small (sounding) groups were heard flying in from the same direction after dark. During morning surveys two small groups (<10) were observed flying from the lake to the south-east and one group of about 10 individuals were observed flying east over hills to the east of the Brand Highway. Due to the directions of flights, the large number of Australian shelducks at Namming Lake and the fluctuating numbers of Australian shelducks at the small lake near the

Nammegarra Road turnoff, it is highly likely that these movements were to or from these water bodies

- After dark, a nankeen night heron and a common greenshank were heard to fly in from the south. It is likely that the night heron roosts by day at Namming Lake and nocturnally forages on the shore of north-east lake, due to the roosting opportunities within the surrounding melaleuca trees at Namming Lake, but it is not known where the common greenshank may have flown in from. However, common greenshank numbers observed at Lake Thetis suggests that movements to this more inland band of lakes may be from near coastal saline wetlands
- Red-necked stints, black-winged stilts and red-capped plovers were observed foraging during the night (spotlighting) at north-east lake and movements observed were limited to accessing different foraging areas of the shoreline
- Lake Thetis:
 - Most movements observed around Lake Thetis were between different shoreline areas for roosting or foraging purposes. A group of five common greenshank and a single Pacific golden plover were observed flying off to the south-south-east at sunset. There is another shallow saline lake in the south-south-east on the eastern side of Pinnacles Drive in Nambung National Park, which is the most likely destination of this movement. The fluctuating numbers of species and abundances at Lake Thetis suggested that birds moved at least on a local basis between similar habitats, although the presence of a common greenshank at the lake situated to Lake Guraga's north-east indicates that this species moves further inland on occasion
 - Movements of observed migratory bird species to these habitats from the northern hemisphere are likely made along near coastal habitats, although the distributions of common sandpiper and common greenshank extend inland considerable distances and so there may be some movements between the inland and coast when conditions are favourable
- Upper Moore River Catchment near Moora:
 - No movements of resident or migratory wading birds were noted at the wetlands along Coomberdale West Road to the north of Moora, or those west of Moora adjacent to Dandaragan Road. However, red-necked avocets and banded stilts are highly nomadic in response to the fluctuations of ephemeral inland lakes and other water bodies and move between different wetlands to access foraging opportunities when they are at their peak. Sharp-tailed sandpiper and the pectoral sandpiper were flushed when another car stopped close by and moved elsewhere in the lake. These sandpipers migrate from the northern hemisphere and likely follow similar habitat down the Moore River catchment from the north
 - There is likely to be some intermittent movement toward Lake Guraga water bodies from these eastern inland water bodies by resident waders, as indicated by the pair of red-necked avocets at the lake situated to Lake Guraga's north-east.

In summary, migratory bird species were found to primarily frequent or move through / between lowland areas where more suitable habitat for these species occurs. Local flyway orientations were considered unlikely to traverse the Project Area, due to the general north to south alignment of drainage basins and coastal wetlands, although the potential for some intermittent east to west bird movements may exist, due to the temporary nature of regional wetlands in response to periodic inundations, particularly those in the east (RPS 2010a).

It is anticipated that the movements of the curlew sandpiper, sharp-tailed sandpiper, pectoral sandpiper and common sandpiper through the Dandaragan landscape would be similar to other migratory sandpiper species (i.e. following open water habitats through the Moore River catchment from the north). Informed by the known movement patterns of migratory sandpiper species in the Dandaragan landscape, it is considered likely that the four sandpiper species would follow the open water habitats through the Moore River catchments when moving east to west during the Western Australian summer period when limited open water resources are available.

5.2.1.5 Confidence assessment

The potential for the curlew sandpiper, sharp-tailed sandpiper, pectoral sandpiper and common sandpiper to occur within the Project Area is underpinned by a contemporary DBCA Threatened and Priority Fauna database search, recent community records (e.g. BirdLife Australia's Birddata database, Ebird's species

observations, Atlas of Living Australia's database), assessments undertaken for the neighbouring wind farms (Ecologia Environment 2017; Alinta Energy 2022; Alinta Energy 2024; Ecoscape 2018, Ecoscape 2019a, Ecoscape 2019b and Ecoscape 2020) and the avifauna assessment (RPS 2010a) for the Proposed Action. There have been no occurrences of curlew sandpiper, sharp-tailed sandpiper, pectoral sandpiper and common sandpiper identified within the Project Area by any of these data sources.

The identification of fauna habitats within the Project Area have been underpinned by the long-term and intensive flora, vegetation and fauna surveys undertaken for the Proposed Action (RPS 2023, Ecologia Environment 2016, Outback Ecology 2014, RPS 2014, Outback Ecology 2010). There has been no habitat identified for the curlew sandpiper, sharp-tailed sandpiper, pectoral sandpiper and common sandpiper within the Project Area by any of these data sources. The local transiting movements and flight paths of migratory sandpiper species between regional wetland environments has been identified as generally following a north to south alignment of drainage basins and coastal wetlands. East to west movements through the local Dandaragan landscape are anticipated to follow the open water habitats through the Moore River catchments.

Informed by the findings of the identified information sources, the curlew sandpiper, sharp-tailed sandpiper, pectoral sandpiper and common sandpiper is considered extremely unlikely to traverse the Project Area where no open water habitat exists for the four sandpiper species.

5.2.2 Fork-tailed swift

The fork-tailed swift is listed as Migratory under the EPBC Act. It is a medium-to-large member of the Apodidae family, with a length of 18 to 21 cm, wingspan of 40 to 42 cm and weight of around 30 to 40 grams. The fork-tailed swift is a non-breeding migratory species from Asia.

There are no significant threats to the fork-tailed swift in Australia. Potential threats include:

- Habitat destruction
- Predation by feral animals.

Migration patterns for the fork-tailed swift include moving south from their primary breeding ground in Siberia to various non-breeding grounds south of the 35th parallel, arriving in Australia in October, before returning to breeding grounds in April (DCCEEW 2024b).

The fork-tailed swift is almost exclusively aerial, flying from less than 1 m to at least 300 m above ground and higher. Habitat for the fork-tailed swift has been identified as inland plains, in addition to foothills and coastal areas like cliffs and beaches. They mostly occur over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh. They are also found at treeless grassland and sandplains covered with spinifex, open farmland and inland and coastal sand-dunes (DCCEEW 2024b).

The species is insectivorous and almost exclusively forages aerially up to hundreds of metres above ground, but also less than 1 m above open areas or over water. The species of food items within Australia are not well known, but is thought to be small bees, wasps, termites and moths (DCCEEW 2024b). They often occur in areas of updraughts, especially around cliffs. They are said to search along edges of low-pressure systems, which assist flight. Low-flying swifts are said to be precursors of unsettled weather, possibly because insect prey fly at a lower altitude when the air is humid and when the air density is low (DCCEEW 2024b). Roosting is primarily aerial, particularly during migration, but fork-tailed swift has also been observed roosting at regular congregation points such as cliff crevices, caves, and dense crowns of trees (Higgins and Davies 1996).

5.2.2.1 Project Area consideration

The EPBC Act Protected Matters Report identifies that the species or species habitat is likely to occur within the Project Area (Appendix S). The Project Area is situated approximately 50 km from the coast and characterised by a variety of habitats but is primarily cleared agricultural land with remnant patches of native vegetation, with the local area exhibiting ephemeral and semi-permanent drainage lines (i.e. Mullering Brook) along the undulating gullies and valleys (RPS 2010a). The five key habitat types occurring within the Project Area are:

- Open pasture / cultivation area, often with scattered trees
- Remnant heathland vegetation

- Woodland remnants / elements
- Areas where various combinations of heathland and/ or woodland are associated with areas dominated by open pasture / cultivation habitats
- Aerial habitats above land for avifauna.

These habitat types do provide potential habitat for the fork-tailed swift. Figure L illustrates the extent DCCEEW's mapping of the species or species habitat likely to occur for the fork-tailed swift.

Water sources within the Project Area include Mullering Brook and farm dams (Figure L):

- Mullering Brook is a tributary of Hill River and is recharged by surface water flows and groundwater (DWER 2018). Mullering Brook receives groundwater discharge from the confined Yarragadee aquifer as baseflow, springs and pools upstream of the Project Area and from the unconfined superficial aquifer found along the Mullering Brook valley (Department of Water 2017). Limited sampling along Mullering Brook in 2008 and 2021 identified an average pH of 7.06 and an average salinity of 7,802 uS/cm electrical conductivity, which is indicative of neutral and brackish water (DWER 2025b). The typical salinity of freshwater is 0 – 1,500 uS/cm. Water in the Mullering Brook is seasonally dependent on rainfall and shallow groundwater levels and its water quality may not always be fresh.
- Farm dams are recharged by surface water flows and potentially by groundwater.

The Mullering Brook and farm dams do not comprise suitable water sources for the species, due to the semi-permanent availability of water, the variable water quality (high salinity) and that the water sources are in a disturbed agricultural setting. The fork-tailed swift is almost exclusively aerial and occupies a wide range of habitats, therefore is unlikely to rely on water sources found in the Project Area.

The fork-tailed swift was not recorded within the Project Area by the Carnaby's Black-Cockatoo and Fork-tailed Swift utilisation survey (BCE 2025), DBCA's Threatened and Priority Fauna database, BirdLife Australia's Birddata database (BirdLife Australia 2024b), Ebird's species observations (Ebird Database 2024), Atlas of Living Australia's database (Atlas of Living Australia 2025d) or the 16 bird census sites established within the Waddi Wind Farm by RPS (2010a).

The utilisation survey was undertaken by experienced ornithologists from August 2024 to January 2025, which overlapped the period when fork-tailed swifts may be expected in Western Australia (in late October, December and January) (BCE 2025). No fork-tailed swifts were seen or heard during the large amount of sampling undertaken when they may be present. In December 2024, a storm-front was observed to the north east of the Project Area, which would provide conditions conducive for the fork-tailed swift. A long-term monitoring project (30 years; approximately 1,320 person-days) in the adjacent Cooljarloo Mine has not encountered fork-tailed swifts, and Dr Mike Bamford has observed the species twice in the region during a bird-watching career spanning nearly half a century. Considering the very infrequent occurrence of fork-tailed swift in the region and paucity of data, the site utilisation frequency and population abundance that occurs in, adjacent to, or may transit or overfly, the Project Area cannot be predicted.

The targeted avifauna field surveys were undertaken by experienced bird ecologists in two separate survey periods, from 29 October to 7 November 2008 and 18 to 26 November 2008 inclusive (RPS 2010a). The timing of the surveys coincides with fork-tailed swift's southern migration (i.e. between October and April) (DCCEEW2024b), hence it is reasonable to expect that the fork-tailed swift would likely have been detected by RPS (2010a) if seasonally present. There is one record of fork-tailed swift in DBCA's database within a 25 km radius of the Project Area and three records of fork-tailed swift in Atlas of Living Australia's database from January 2007 and March 2013 observed flying overhead in Cervantes and Nambung National Park, over 25 km west of the Project Area (Atlas of Living Australia 2025d). Because the species has broad habitat specifications and wide-ranging movements across open areas within Australia, its occurrence within the Project Area on an intermittent seasonal basis cannot be entirely discounted.

Further, the fork-tailed swift was not recorded within 20 bird census sites established within Yandin Wind Farm or the seven representative plots outside of the wind farm sites by RPS (2010a), nor was the species recorded by avian surveys and mortality and abundance monitoring (Ecoscape 2018, Ecoscape 2019a, Ecoscape 2019b and Ecoscape 2020) at the Badgingarra Wind Farm, located approximately 28 km north-west of the Project Area. The fork-tailed swift was also not recorded by either the pre-development avian survey (Ecologia Environment 2017) or the monthly carcass searches (Alinta Energy 2022; Alinta Energy 2024) undertaken at the Yandin Wind Farm approximately 10 to 25 km south-east of the Waddi Wind Farm. Additionally, the Ecologia Environment (2017) avifauna assessment undertaken for the Yandin Wind Farm confirmed that the avian fauna assemblage remained unchanged from the earlier RPS (2010a) study at the Yandin Wind Farm.

The surveys conducted for the Badgingarra Wind Farm were undertaken in October, December, February, and April (Ecoscape 2019 and Ecoscape 2020), whilst the surveys conducted for the Yandin Wind Farm were undertaken in September and from December to November (Ecologia Environment 2017; Alinta Energy 2022; Alinta Energy 2024). These survey periods correlate to periods where the fork-tailed swift can be present in Western Australia (i.e. between October and April) (DCCEEW 2024e).

Informed by the findings of the Carnaby's Black-Cockatoo and Fork-tailed Swift utilisation survey (BCE 2025), DBCA's Threatened and Priority Fauna database, BirdLife Australia's Birddata database (BirdLife Australia 2024b), Ebird's species observations (Ebird Database 2024), Atlas of Living Australia's database (Atlas of Living Australia 2025d), RPS (2010a) avifauna assessment and the assessments undertaken for the neighbouring wind farms (Ecologia Environment 2017; Alinta Energy 2022; Alinta Energy 2024; Ecoscape 2018, Ecoscape 2019a, Ecoscape 2019b and Ecoscape 2020), the fork-tailed swift is considered likely to occur very infrequently over the Project Area.

5.2.2.2 Regional habitat

The fork-tailed swift is an aerial species that occurs widely over a range of habitats at a range of elevations from quite close to the ground to at least 300 m above the ground. Although it occurs across a wide range of habitats within Australia it is mostly observed over inland plains and is also seen over coastal beaches and cliffs. Dry open habitats are present within the Project Area and surrounds, and although the sky above these habitats and surrounds offers foraging opportunities for several bird species, the fork-tailed swift is only likely to occur locally on an intermittent spasmodic seasonal basis. There is one record of fork-tailed swift in DBCA's database approximately 29 km to the north of the Project Area and three records of fork-tailed swift in Atlas of Living Australia's database from January 2007 and March 2013 observed flying overhead in Cervantes and Nambung National Park, over 25 km west of the Project Area (Atlas of Living Australia 2025d) (Figure L).

5.2.2.3 Transiting and flight paths

There were no fork-tailed swift individuals observed during the survey periods from anywhere within the Project Area. This may be due to the fact the species is transitory at most sites, and they are therefore unlikely to be recorded on specific surveys of short duration. However, the species may occur locally during dispersive movements, particularly in the summer months. Widespread records occur from Wyndham through north and east Kimberley to south-west Pilbara. Widespread records also occur in coastal and sub coastal areas between Carnarvon and Augusta including near and offshore islands. Sparsely scattered records occur along the south coast from Denmark east to Cocklebidy on the Great Australian Bight. Sparsely scattered records also occur inland (Department of the Environment 2015a).

No fork-tailed swifts were seen or heard during the large amount of sampling undertaken when they may be present in October and December 2024 and January 2025 (BCE 2025). A long-term monitoring project (30 years; approximately 1,320 person-days) in the adjacent Cooljarloo Mine has not encountered fork-tailed swifts, and Dr Mike Bamford has observed the species twice in the region during a bird-watching career spanning nearly half a century. Considering the very infrequent occurrence of fork-tailed swift in the region, the risk to fork-tailed swifts from the wind turbine RSA and transmission line is negligible.

5.2.2.4 Confidence assessment

The potential for the fork-tailed swift to occur within the Project Area is underpinned by a Carnaby's Black-Cockatoo and Fork-tailed Swift utilisation survey (BCE 2025), a contemporary DBCA Threatened and Priority Fauna database search, recent community records (e.g. BirdLife Australia's Birddata database, Ebird's species observations, Atlas of Living Australia's database), assessments undertaken for the neighbouring wind farms (Ecologia Environment 2017; Alinta Energy 2022; Alinta Energy 2024; Ecoscape 2018, Ecoscape 2019a, Ecoscape 2019b and Ecoscape 2020) and the avifauna assessment (RPS 2010a) for the Proposed Action. There have been no occurrences of fork-tailed swift identified within the Project Area by any of these data sources.

The identification of fauna habitats within the Project Area have been underpinned by the flora, vegetation and fauna surveys undertaken for the Proposed Action (RPS 2023, Ecologia Environment 2016, Outback Ecology 2014, RPS 2014, Outback Ecology 2010). All habitat types within the Project Area represent potential habitat for this species.

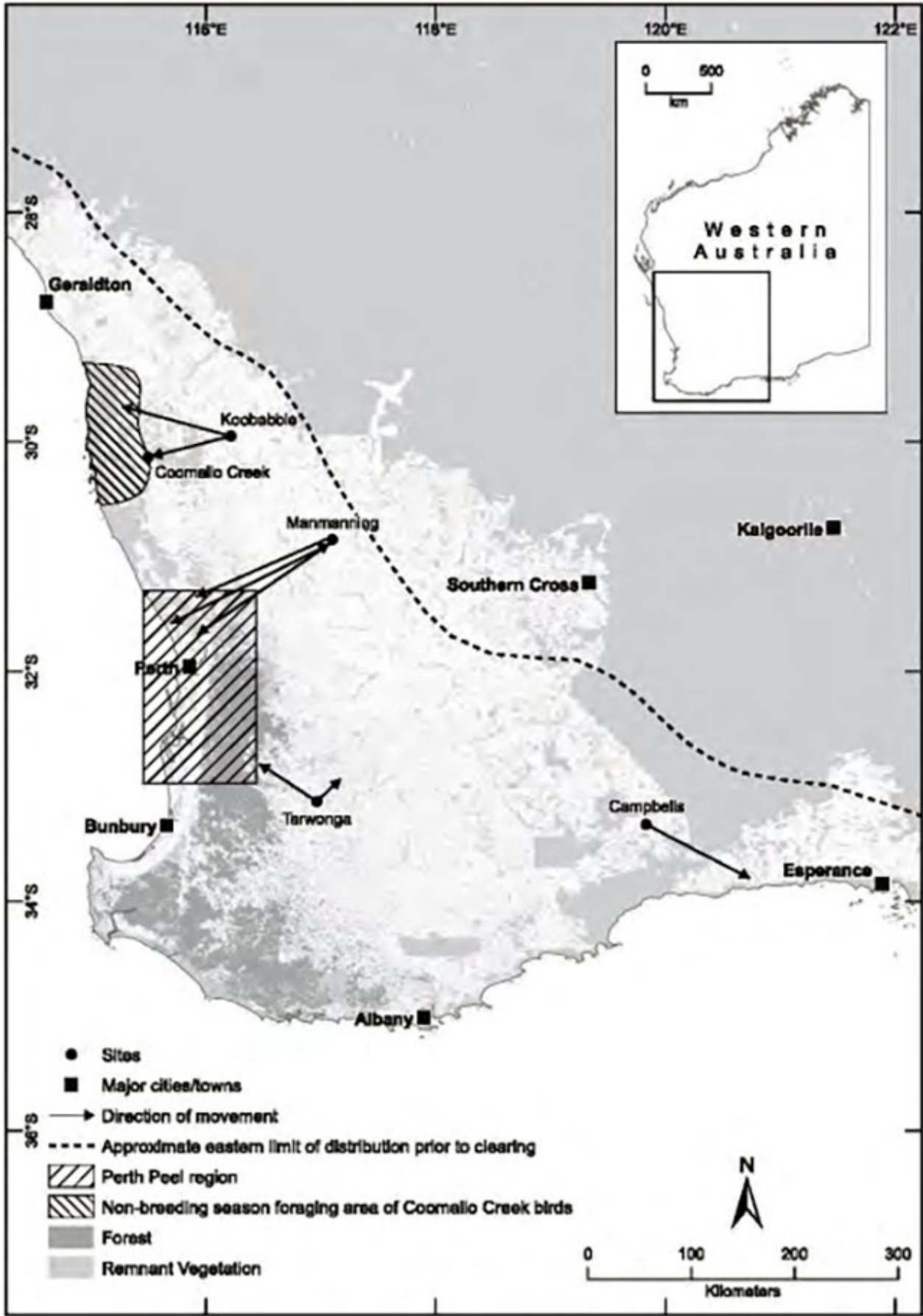
Informed by the findings of the identified information sources, the fork-tailed swift is considered to possibly occur on a very intermittent spasmodic seasonal basis within the Project Area.

5.3 Carnaby's cockatoo specific assessment

Carnaby's cockatoo is listed as Endangered under the EPBC Act. It is endemic to the south-west of Western Australia, with a widespread distribution north to the lower Murchison River and east to Nabawa, Wilroy, Waddi Forest, Nugadong, Manmanning, Durokoppin, Noogar (Moorine Rock), Lake Cronin, Ravensthorpe Range, head of Oldfield River, 20 km east south east of Coondingup and Cape Arid; also casual on Rottnest Island (Johnstone and Storr 1998).

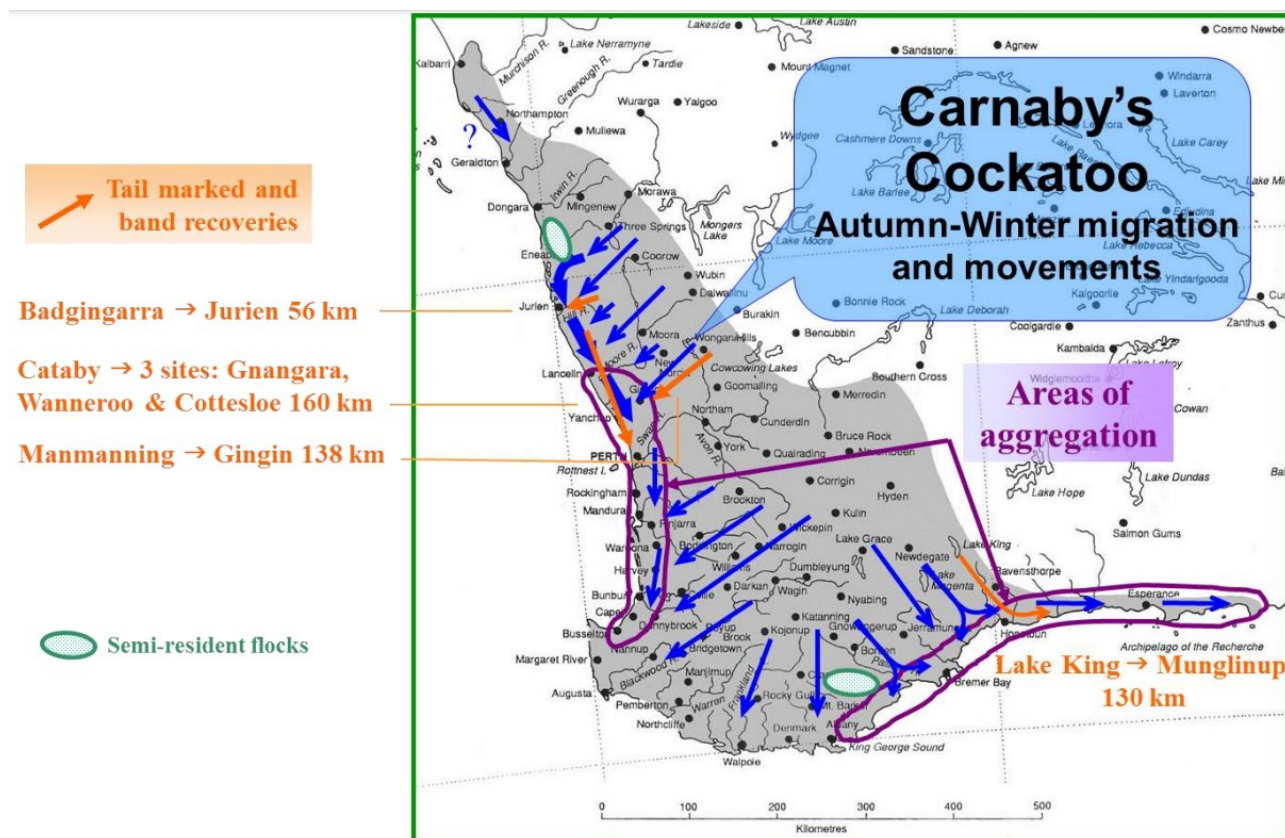
Carnaby's cockatoo occurs in uncleared or remnant native eucalypt woodlands, particularly those containing salmon gum and wandoo, and in shrubland or kwongan heathland dominated by hakea, dryandra, banksia and grevillea species. They also occur in remnant patches of native vegetation on land otherwise cleared for agriculture. Because of the large-scale post-war clearing of semi-arid sandplains, this species has declined in much of the Wheatbelt (Johnstone and Kirkby 2019a). The species forages seasonally in pine plantations in areas that receive high rainfall (e.g. Swan Coastal Plain) and around the Perth Metropolitan area on both native and non-native plants.

The broad patterns of seasonal Carnaby's cockatoo migrations across the south-west of Western Australia are depicted in Figure 6 and Figure 7.



(Source: Williams et al. 2017)

Figure 6: Seasonal migration patterns of Carnaby's cockatoo



(source: Johnstone and Kirkby 2019b)

Figure 7: Migration and movements of Carnaby's cockatoo

Carnaby's cockatoo usually travel in pairs or small flocks, although they are also seen in large flocks (up to 10,000 individuals) in the non-breeding season (late spring to mid-winter), especially around Banksia scrubs and pine plantations on the Swan Coastal Plain. The breeding season lasts from late winter through spring and may continue into early summer (DCCEEW 2024a).

Carnaby's cockatoo is a postnuptial nomad, and birds originating in the central and northern Wheatbelt tending to move west after breeding. For example, birds breeding in the Badgingarra, Dandaragan, Moora and Bindoon regions tend to move west after breeding into higher rainfall areas especially the near-coastal Banksia scrubs (e.g. Wanagarren Nature Reserve, Nilgen Nature Reserve, Yanchep area and Wanneroo area). Then many of these birds move further south onto the southern Swan Coastal Plain including the southern Perth Metropolitan area (Johnstone and Kirkby 2019a). Not all populations migrate during the autumn – winter, such as Carnaby's cockatoo flocks in Badgingarra that are largely resident (Johnstone and Kirkby 2019b).

This species is uncommon to common in the subhumid zone and wetter parts of the semiarid zone and scarce to patchily distributed in the drier parts of its range (e.g. north of Arrowsmith Lake and east of Marchagee, New Norcia, Toodyay, Tarin Rock and Lake Magenta). The migration and movement of birds from the south-east portion of their breeding range (e.g. areas such as Broomehill, Lake Cronin, Hatter Hill and Lake King) tends to be from inland breeding sites to the south coast then east or west along it (Johnstone and Kirkby 2019a).

The loss of breeding, foraging and night-roosting habitat are considered the main threatening processes for Carnaby's cockatoo. Other threatening process includes climate change, habitat fragmentation, removal of nest hollows, competition for hollows and clearing of foraging habitat. Additionally, the mortality of individual birds through vehicle strike, illegal shooting and illegal poaching are also key contributors to population decline given the slow reproductive rate of Carnaby's cockatoo (DPaW 2013, DCCEEW 2025i).

Life history traits such as low reproductive rates (including low clutch size), long immature periods (four years), long generational time (ca. 15 years) and the availability of suitable tree hollows increase the susceptibility of Carnaby's cockatoo to these threatening processes (Williams et al. 2017). The rapid decline of Carnaby's cockatoo populations has been compounded by these 'slow' life histories – low reproductive rates over long lifespans (Williams et al. 2017). Recent research has found, that assuming no changes in the

extent or quality of breeding habitat, and current breeding or survival rates, the most important factor currently limiting population growth for Carnaby's cockatoo is adult survival (Williams et al. 2017).

Even a small increase in adult mortality may lead to population decline via recruitment failure. The sensitivity of population viability to adult survival is characteristic of cockatoos and other long-lived birds (Stahl and Oli 2006; Williams et al. 2017). Density-dependent mortality is caused when the carrying capacity of an area, based on resource availability, is exceeded. This is caused through the reduction of available resources from habitat loss. Density-independent mortality is caused by a variety of factors including vehicle strike, shooting, poaching of eggs and birds, or injuries sustained through vegetation clearing. Avoiding these density-independent mortality events is extremely important to the recovery of the species (DAWE 2022).

5.3.1 Regional Carnaby's cockatoo habitat

Key Biodiversity Areas for Carnaby's cockatoo that are situated regionally to the Project Area have been identified by DPaW (2013), Dutson (2009), Birdlife International (2022) and Murdoch University (2024). These are:

- **Cataby:** Located approximately 8 km south of the Project Area on the Cataby Brook watercourse and supports up to 24 breeding pairs of Carnaby's cockatoo (Figure N; BirdLife International 2022; Murdoch University 2024)
- **Badgingarra:** Located approximately 5 km north-east of the Project Area. This area is mapped by DBCA as a known breeding site for Carnaby's cockatoo (Figure N; Murdoch University 2024). The Project Area is within the daily foraging range of the breeding site, and it is anticipated that birds from this breeding site would use foraging habitat within the Project Area (Murdoch University 2024) as well as other areas
- **Moora:** Located approximately 35 km east of the Project Area and supports up to 60 breeding pairs of Carnaby's cockatoo (Birdlife International 2022; Murdoch University 2024). This area is mapped by DBCA as a known breeding site.
- **Coomallo Creek:** Located approximately 40 km to the north-east of the Project Area. This area supports at least 1% of the Carnaby's cockatoo breeding population (minimum of 40 breeding pairs) which nest in woodland remnants and isolated paddock trees and feed in native shrublands (Birdlife International 2022; Saunders et al. 2023; Ecoscape 2018)
- **Gillingarra:** Located approximately 50 km to the south-east of the Project Area and supports up to 20 breeding pairs of Carnaby's cockatoo (Birdlife International 2022). Carnaby's cockatoo nest in Marri trees and feed in native shrublands.
- **Walebing:** Located approximately 65 km to the east of the Project Area and supports up to 40 breeding pairs of Carnaby's cockatoo (Birdlife International 2022). Carnaby's cockatoo nest in woodland remnants and isolated paddock trees and feed in native shrublands.
- **Koobabbie:** Located near Coorow, which is approximately 100 km north-east of the Project Area. This large 7,173 ha pastoral property has 254 ha of remnant Wandoo and Salmon Gum woodland vegetation. This site supports at least 1% of the Carnaby's cockatoo breeding population (up to 32 breeding pairs). Fledglings have been recorded at Coomallo Creek and Beekeepers Nature Reserve (Birdlife International 2022; Saunders et al. 2014; Ecoscape 2018)
- **Northern Swan Coastal Plain:** Located between the Swan River and Moore River, which is approximately 70 – 150 km south of the Project Area. This area supports 4,600 to 15,000 birds in the non-breeding season and a small number of pairs of breeding birds; this is the largest population of birds that gather in the non-breeding season (Birdlife International 2022)
- **Breeding sites around the Project Area** include the Three springs, Coomallo, Carnamah, Coorow, Badgingarra and Moora regions, which are vacated by the end of February each year. Adults and fledglings fly west to coastal feeding habitat where they aggregate in flocks in kwongan heath and pine plantations. Occasionally a flock of 60–100 birds remain in the Badgingarra National Park area into March to April. From July through to September birds fly back to breeding sites (Ecoscape 2018).

There is over 18,000 ha of potential Carnaby's cockatoo foraging habitat identified within conservation estates within 12 km of the Project Area, including:

- **Badgingarra National Park:** 13,108 ha
- **Badgingarra Conservation Park** (Lot 4134 on Deposited Plan 240347; Crown reserve 41986): 2,369 ha

- Lot 3901 on Deposited Plan 209568 (Crown Reserve 27216): 1,074 ha
- Unnamed nature reserve: 1,012 ha
- Wonderrah Nature Reserve: 439 ha
- Minyulo Nature Reserve: 86 ha.

Additionally, there are substantial areas of Carnaby's cockatoo habitat outside of the conservation estates and Crown reserves, which are also utilised for foraging, roosting and nesting (Figure N and Figure O).

5.3.1.1 Database and field survey records

Carnaby's cockatoo has been recorded frequently in the DBCA's Threatened and Priority Fauna database, the BirdLife Australia's Birddata database, Ebird Database and Atlas of Living Australia's database within 50 km of the Project Area:

- There are 298 records of Carnaby's cockatoo in the DBCA's Threatened and Priority Fauna database within a 25 km radius of the Project Area. Only one record was within the Project Area and was situated over 2 km to the east of the turbine locations (Figure M)
- BirdLife Australia's Birddata database has three historic Carnaby's cockatoo records from 2001 and 2003 located immediately adjacent to the south, east and north-west of Project Area (BirdLife Australia 2024f)
- Ebird's species observations identify that Carnaby's cockatoo has been recorded at the Regans Ford rest area in 2023 (Ebird Database 2024)
- Atlas of Living Australia's database identified 282 records (including singular birds to flocks of 230 birds) within an approximate radius of 50 km of the Project Area (Atlas of Living Australia 2025d)

Carnaby's cockatoo has been recorded in historical surveys undertaken for the Proposed Action, including fifteen Carnaby's cockatoo records identified within the 36 bird census sites established within the Waddi and Yandin Wind Farm sites by RPS (2010a). There were 67 Carnaby's cockatoo records outside of the established bird census sites and 18 records within the representative plots outside of the wind farm sites (RPS 2010a). Of these 100 Carnaby's cockatoo records, 36 were associated with the Project Area (RPS 2010a).

Carnaby's cockatoo have been observed frequently within 20 km of the Project Area. There are DBCA records of one roosting site and 99 confirmed and potential breeding sites, which are typically located adjacent to watercourses. Ninety-six of the 99 breeding sites are within 12 km of the Project Area (Figure N). This includes the Cataby Key Biodiversity Area, which supports up to 24 breeding pairs of Carnaby's cockatoo located approximately 8 km south of the Project Area on the Cataby Brook watercourse (BirdLife International 2022). Carnaby's cockatoos mainly forage in areas up to 12 km from nesting trees during the breeding season and in areas up to 20 km, or higher, from known night-roosting habitat during the non-breeding season (DAWE 2022). A flock of some fifty birds were observed to regularly roost in woodland habitats associated with the Waddi Bush Resort to the north of the Project Area (RPS 2010a). This observation accords with the BirdLife Australia's Birddata database record immediately to the north-west of Project Area (BirdLife Australia 2024f) and the Koonah Road site identified by Murdoch University (2024).

A Carnaby's cockatoo and fork-tailed swift utilisation survey was undertaken within and up to 6 km from the Project Area from August 2024 to January 2025. The survey involved Vantage Point surveys, Focal Follow surveys and acoustic recordings undertaken from the early morning to late evening. Carnaby's cockatoos were frequently observed (625 separate point records), with flock sizes of 1 – 52 birds and an average flock size of 6 birds. The maximum flock size of 52 birds was relatively low compared to other studied sites in the Cataby region (flocks of up to 300 and 400 birds). Foraging, roosting, transiting and breeding activities were observed, with one pair successfully raising a chick outside the Project Area (BCE 2025).

The timing of the 2024-2025 survey, from August 2024 to January 2025, coincides with Carnaby's cockatoo breeding season in the Wheatbelt region, and migration from the Wheatbelt region in the east to the coastal plains in the west.

Flight behaviours recorded were considered representative of Carnaby's cockatoo during the late winter, spring and early summer (i.e. the breeding season). Carnaby's cockatoo regularly used airspace south-west along Mullering Road, along the Minyulo Nature Reserve and between and around the three roosting locations along the Project Area's eastern boundary (BCE 2025). The likely RSA assessed by BCE (2025) ranged from 44 m to 206 m (the maximum RSA is 58 m to 220 m; Table 4). Carnaby's cockatoo flights above

44 m comprised 0.40% of all bird time records. Furthermore, these four flights were recorded of single birds flying at 40 m or above and were in the lower areas of the landscape (BCE 2025).

Murdoch University identified Carnaby's cockatoo night-roost locations and tracked flock movements in the vicinity of the Project Area from satellite tags attached to 14 individual Carnaby's cockatoos from five separate tag deployments in 2017, 2021 and 2022 (i.e. releases of rehabilitated cockatoos with tags attached) (Murdoch University 2024). Murdoch University recorded general Carnaby's cockatoo flock movements in various areas proximate to the Project Area from five separate tag deployments in 2017, 2021 and 2022, including:

- Cooljarloo area which is located within 6 km south-west of the Project Area. Collected records included four adult breeding Carnaby's cockatoos (with their flocks) arriving from the Cataby breeding area in January or February, and a flock of around 100 birds roosting in May
- Koonah Road area which is located within 6 km north of the Project Area. Collected records included two Carnaby's cockatoos (with their flocks) likely roosting on pine trees, used across the months of December – March, and May
- Cataby breeding area which is located within 6 – 12 km south and beyond the Project Area. Collected records included a Cataby flock of around 40 birds, indicating that roughly 20 breeding pairs use this area, and the number of birds increased to about 200 across December to March as birds arrived from other breeding areas with newly fledged young.
- Emu Downs area which is located within 6 – 12 km north-east and beyond the Project Area. Collected records included at least five Carnaby's cockatoos (with their flocks) used roosts from December to April.

A targeted Carnaby's cockatoo survey which included the portion of the Project Area where the turbines are located was undertaken between 15 and 16 January 2009 as part of RPS (2010a). The survey was conducted through the cooler parts of the day from dawn to noon and from later afternoon until dusk and concentrated on areas between large stands of vegetation and turbine locations. These areas were selected with the expectation that if Carnaby's cockatoos were flying across the site and at risk of turbine strike they would be observed flying through such locations.

The timing of the 2009 survey in January coincides with Carnaby's cockatoo migration from the Wheatbelt region in the east to the coastal plains in the west. Habitat utilisation was consistent with what is generally known for this species, with on-site occurrences largely confined to intact marri (*Corymbia calophylla*) woodland areas, which occur as riparian remnants along valley bottom watercourses and lower slopes, and tall heathland communities and their remnants on sand plains and lower slopes in the wider locality. Movements of Carnaby's cockatoo during the 2009 survey period were noted as occurring along lowland woodland corridors within valleys which accords with foraging, roosting and breeding habitat requirements of this species (RPS 2010a).

The RSA assessed by RPS (2010a) ranged from 40 – 152 m above ground level. Of the 100 Carnaby's cockatoo records, 88% were within 40 m of the ground and 12% were within the RSA. Those observations made within the RSA were largely in down-slope areas outside formal survey plots. Along the ridgetop environments Carnaby's cockatoo was observed to be moving intently between locations rather than milling or foraging (RPS 2010a). There were no records of Carnaby's cockatoo occurring within the assessed RSA in ridge top contexts nor of this species flying above 152 m (RPS 2010a). This is likely due to avoidance of moderate to high wind velocities that characterise the wind farm site on a daily basis and the somewhat laboured flight action of Carnaby's cockatoos.

5.3.1.2 Proximate wind farms

Carnaby's cockatoos have been surveyed and monitored at wind farms proximate to the Project Area; two large-scale operating wind farms, Badgingarra Wind Farm and Yandin Wind Farm, and at a proposed wind farm, Parron Wind Farm (Figure 5). The key findings of the surveys and monitoring programs relevant to Carnaby's cockatoo observations and flight heights are outlined as follows:

- Badgingarra Wind Farm monitoring
 - Baseline monitoring surveys for Carnaby's cockatoos, and other birds, were undertaken at APA's Badgingarra Wind Farm, situated approximately between 20 and 35 km north-west of the Waddi Wind Farm, from October 2017 to April 2018 (Ecoscape 2018).

- The Badgingarra Wind Farm was found to be used as part of daily foraging flight patterns with counts ranging from individual birds up to flocks of 300 to 400 birds. Carnaby's cockatoo was the most recorded species accounting for 36.1% of observations (3,541 counted) followed by Australian ravens (9.1%), galahs (6.9%), straw-necked ibis (5.7%) and white-cheeked honeyeaters (5.6%) (Ecoscape 2018).
- Despite the high number of Carnaby's cockatoo relative to other bird species, it was anticipated that the operational Badgingarra Wind Farm would have a limited impact as most individuals from the 2017 and 2018 surveys were observed flying at heights expected to be below rotor height.
- The RSA of the Badgingarra Wind Farm ranges from 20 – 150 m above ground level (Ecoscape 2018) and is relatively comparable to the revised RSA for the Proposed Action, which is anticipated to range from 44 – 206 m (proposed maximum of 58 – 220 m). Carnaby's cockatoo was recorded either feeding or flying below the RSA by Ecoscape (2018).
- Operational monitoring surveys for Carnaby's cockatoos, and other birds, were undertaken at APA's Badgingarra Wind Farm, situated approximately between 20 km and 35 km north-west of the Waddi Wind Farm, from February to September 2019 (Ecoscape 2019a).
 - Carnaby's cockatoo was recorded from 44% of the 16 survey sites (seven out of 16). Abundance ranged from records of two individuals up to a large flock of 189 birds at reference site in February 2019. In total, 923 Carnaby's cockatoo were counted over the 2019 survey periods, 83 at the impact sites and 840 at the reference sites (Ecoscape 2019a).
 - Five flocks were recorded at a flight height of between 20 – 150 m, i.e. at rotor height, being 20% of the total number of flocks observed (25 flocks). Flight height is an indicator of the behaviour of the flocks, whether feeding or travelling. The dominant behaviour observed was feeding, flying low over native vegetation with frequent stops to forage. Flight heights within the wind farm turbines at rotor height (20 – 150 m) was only observed where no native vegetation exists and therefore the birds were most likely travelling to another forage or roost site nearby.
 - No Carnaby's cockatoo carcasses were recorded during any of the mortality surveys (Ecoscape 2019a, Ecoscape 2019b, Ecoscape 2020).
 - The Badgingarra Wind Farm monitoring reports are presented in Appendix T.
- Yandin Wind Farm monitoring
 - An avifauna assessment for the Yandin Wind Farm was undertaken in 2017 (Ecologia Environment 2017) to augment the RPS (2010a) study.
 - Sixty-one species were recorded within the Yandin Wind Farm area by RPS (2010a) and 44 species from 22 census sites within seven habitat types were recorded by Ecologia Environment (2017).
 - All birds recorded by Ecologia Environment (2017) had previously been recorded by RPS (2010a) during the regional study, apart from the Australasian pipit (*Anthus novaeseelandiae*) and the emu (*Dromaius novaehollandiae*) (one individual sighted) indicating that the composition of bird assemblages in the local Cooljarloo area has changed little between the two surveys. Seventeen Carnaby's cockatoo records were identified within the proteaceous heath and dryandra-allocauarina shrubland.
 - Carnaby's cockatoo was commonly recorded flying between 0 – 40 m above the ground (approximately 25% of the time) and occasionally recorded between 40 – 152 m above the ground (less than 5% of the time).
 - Monthly carcass monitoring for Carnaby's cockatoos, and other birds, were undertaken during operation at Alinta Energy's Yandin Wind Farm, situated approximately 10 to 25 km south-east of the Waddi Wind Farm, from December 2021 to November 2023 (Alinta Energy 2022; Alinta Energy 2024).
 - Flocks of Carnaby's cockatoo, ranging from one to 80 individual birds, were recorded foraging and overflying habitat within the Yandin Wind Farm during operation on 13 occasions during the two years of surveys (Alinta Energy 2024). Carnaby's cockatoos were recorded overflying the windfarm while transiting and foraging in bushland, pine plantations and trees within the

Yandin Wind Farm (Alinta Energy 2024). The largest flock (approximately 80 birds) was recorded foraging in marri (*Corymbia calophylla*) trees and pine plantations north and south of Dambadjie Road between two operating wind turbines (Alinta Energy 2022).

- Maximum flight height observed was consistently below the RSA (Alinta Energy 2024). The ground clearance to lowest turbine tip (i.e. 0 – 28 m) is less than the Proposed Action (i.e. 0 – 44 m).
- No injured Carnaby's cockatoo or Carnaby's cockatoo carcasses were recorded during the construction phase or the two years of operational monitoring (Alinta 2024). No injured migratory birds or migratory bird carcasses were recorded during the construction phase or the two years of operational monitoring (Alinta Energy 2024).
- The Yandin Wind Farm monitoring reports are presented in Appendix U.
- Parron Wind Farm monitoring
 - A basic fauna survey and a targeted bird and bat survey was undertaken at Zephyr Energy Pty Ltd's Parron Wind Farm, situated approximately 16 to 30 km north-west of the Waddi Wind Farm (Emerge Associates 2024). The survey was undertaken from 18 September 2023 to 22 September 2023 and a portion of the site was surveyed on 25 September 2024.
 - No Carnaby's cockatoos were observed during the field work, however foraging evidence attributed to Carnaby's cockatoos in the form of chewed banksia fruits was recorded.

5.3.2 Site-specific Carnaby's cockatoo assessments

The site specific Carnaby's cockatoo surveys and assessments undertaken for the Waddi Wind Farm and key findings relative to Carnaby's cockatoo are presented in Table 13.

Table 13: Site specific Carnaby's cockatoo surveys and assessments undertaken for the Waddi Wind Farm and key findings

Fauna survey	Fauna investigation	Key findings
Avifauna Assessment, Proposed Wind Farm Development Dandaragan Shire (RPS 2010a; Appendix L)	A targeted Carnaby's cockatoo survey was undertaken between 15 to 16 January 2009	• Most of avifauna observed within the Project Area were common bird species. The greatest diversity of birds occurred within structurally diverse native vegetation, including woodland with intact understorey vegetation, which does not characterise the elevated open country locations selected for wind turbine sitings • A general trend in bird movements in ridge-top contexts was relatively low flight elevations, possibly in response to the moderate to strong winds that characterise the Koodiwoodie Range on a daily basis. • Carnaby's cockatoo, was observed to be associated with woodland and tall heathland, with its movements generally following vegetated valley corridors (i.e. outside the potential turbine locations) • Local flyway orientations were considered unlikely to traverse the proposed wind farm location, due to the general north to south alignment of drainage basins and coastal wetlands • Based on the results of the avifauna investigations, it was concluded that no bird species is considered to be at risk of a significant adverse impact by the Waddi Wind Farm, either in isolation or through cumulative effects from the existing and currently proposed wind farms in the region. These conclusions were premised on the finding that most of species recorded and potentially occurring within the wind farm site were low flying or concentrated in lower valleys and heathlands where turbines are not located
Fauna Assessment, Waddi Wind Farm (RPS 2014; Appendix K)	• Level 1 reconnaissance fauna survey for the Project Area was undertaken in November 2008 • An additional site inspection was undertaken in 2013 to provide specialist technical advice to assist in a revision of the data from the 2008 survey, and to inspect sites outside the original footprint due to minor changes in the footprint of the proposed development. This primarily consisted of the transmission line route to the existing Cataby substation and the location of the on-site Waddi substation and associated access and distribution line locations • This report was used to: – Review fauna lists and occurrences and place them in context of their ecological significance – Identify fragile habitats in the survey area on which fauna may depend – Identify any ecological processes in the survey area on which fauna may depend	Risks to Carnaby's cockatoo with respect to collision with wind turbines is considered to be low as this species was observed flying through lower lying areas and valleys and were not observed flying at the higher topographies on which the turbines are located.

Fauna survey	Fauna investigation	Key findings
	Identify any potential impacts on fauna from the wind farm and make recommendations to minimise impacts	
Waddi Wind Farm Spring Flora and Vegetation Survey and Black Cockatoo Habitat Survey (Outback Ecology 2014; Appendix J)	- Significant fauna habitat assessment for black cockatoos assessed potential breeding, night-roosting, and foraging habitat within two substation options and the proposed transmission line route. - Significant fauna habitat assessment for black cockatoos was undertaken between 30 October and 1 November 2013 - Locations of hollow-bearing trees were recorded, and the presence of potential food-bearing flora species was noted. Searches for evidence of black cockatoo presence were conducted around trees that potentially act as foraging or roost trees	- Three marri (<i>Corymbia calophylla</i>) trees with potential to develop hollows were found in the survey area where the transmission line route crosses Mullering Brook - Suitable Carnaby's cockatoo foraging habitat was identified, with an abundance of proteaceous species generally located in the transmission line route
Waddi Wind Farm proposed action – Cataby Supplementary Flora, Vegetation and Fauna Survey (Ecologia Environment 2016; Appendix I)	- Supplementary survey covering 23.4 ha to inform alteration(s) to the transmission line alignment and substation connection. The field component of the survey was conducted on 6 October 2016 (spring). Field survey comprised a targeted survey for foraging habitat and significant trees for Carnaby's cockatoo and targeted tree survey to identify any trees over 10 m high or capable of growing over 10 m in height - Nine separate fauna habitat assessment were conducted at representative locations within broad habitat patches with the identified habitat types mapped. Significant trees and Carnaby's cockatoo foraging habitat and feeding evidence was recorded	- Carnaby's cockatoo was recorded within the survey area. This species was heard flying above the Banksia Woodland habitat - Approximately half the survey area (7.5 ha) comprised Banksia Woodland fauna habitat and was considered suitable foraging habitat for Carnaby's cockatoo - Potentially significant Carnaby's cockatoo habitat trees were present as isolated, individual living and stag marri (<i>Corymbia calophylla</i>) trees in the cleared farmland. A total of 24 trees with a Diameter at Breast Height (DBH) estimated to be greater than 500 millimetres (mm) were mapped - Both living and stag trees contained hollows, potentially able to be used by Carnaby's cockatoo for breeding. The living marri trees also represent a potential food resource and roosting habitat - Use of these potentially significant trees by Carnaby's cockatoo was not confirmed (i.e. there are no data to suggest they are 'known' breeding or night-roosting trees)
Black-Cockatoo habitat assessment for the Waddi Wind Farm transmission line alignment and the nominated areas in the adjacent farmland (Terrestrial Ecosystems 2022; Appendix H)	- Targeted black cockatoo habitat survey was undertaken between 14–15 October 2021 for a 1,408-ha extent and on 28 October 2022 for an additional 42 ha extent - Assessed all vegetation (excluding planted crops, and paddocks cleared or left as fallow) using the foraging habitat categories as described in the <i>Referral guideline for 3 WA threatened black cockatoo species</i> (DAWE 2022) - All potential black cockatoo breeding trees (i.e. eucalypts with a DBH of greater than 500 mm) had their DBH	- Trees were classified as in-situ native and non-planted, with the native trees typically being found either in the conservation reserve, in the proposed transmission line route or roadside vegetation - Many of the larger trees, particularly those in paddocks had been planted, and the majority are non-endemic eucalypts or pine trees. Groves of planted trees contained species that do not typically form hollows nor provide a foraging resource for black cockatoos, and trunks have often grown at oblique angles 967 trees were assessed within the survey area with 66 marri (<i>Corymbia calophylla</i>) trees, which were primarily proximate to Mullering Brook, were identified as potential black cockatoo nesting trees

Fauna survey	Fauna investigation	Key findings
	measured and any eucalypt trees with hollows of suitable dimensions for a black cockatoo nesting site were noted and the hollow(s) dimensions recorded	- No evidence of black cockatoos foraging in the survey area was detected, nor were any black cockatoos seen. Chewing of banksia infructescences and pinecones by black cockatoos is obvious, but was not observed - No evidence to indicate that Carnaby's cockatoo was breeding in or near the survey area was identified
Carnaby's Black-Cockatoo and Fork-tailed Swift utilisation survey (BCE 2025; Appendix C)	- Carnaby's cockatoo and fork-tailed swift utilisation survey was undertaken in 26–27 August 7–9 October 20–22 October and 6, 16–17 and 20 December 2024, and 6–7 and 10 January 2025. Survey boundaries are presented in Figure J - The utilisation survey encompassed Vantage Point surveys (2 Vantage Points within the Project Area, 2 Vantage Points at control sites), acoustic recording (2 units within the Project Area) and Focal Follow surveys (within and up to 6 km outside the Project Area)	- Carnaby's cockatoos were recorded throughout each survey campaign on and around the Waddi Wind Farm, during which time 148 separate flights were recorded, and were defined by 625 separate point records. The recorded average group size of Carnaby's cockatoo was 6 birds, with a maximum of 52 birds. A high number of Carnaby's cockatoo sightings were in the lower landscape along the Project Area's eastern boundary, with occasional forays of smaller groups across higher ground in the south and centre (Figure M) (BCE 2025). - Carnaby's cockatoo were recorded feeding on Hakea, Banksia, Marri and pines, with Banksia heath and Marri woodland frequently targeted by the species, and in cropped paddocks of canola and lupin and on wild radish as weed species. Foraging signs were recorded proximate to the Disturbance Area, and within and beyond the Project Area (Figure O) (BCE 2025) - Night roost evidence was recorded at six separate locations within or near the Project Area (Figure N), and a roost location to the north of the Waddi Bush Resort is suspected (BCE 2025) - Nesting was observed in one tree on Minyulo Brook with one pair successfully raising a chick outside the Project Area (Figure N). There were several Wandoo and Marri trees with chewed hollows consistent with nesting Carnaby's cockatoos (potential nesting trees) along Minyulo Brook and in woodland north of Waddi Road. The known and potential nesting trees are located along the Project Area's eastern boundary (BCE 2025). - Flight behaviours recorded were considered representative of Carnaby's cockatoo during the late winter, spring and early summer (i.e. the breeding season). Carnaby's cockatoo regularly used airspace south-west along Mullering Road, along the Minyulo Nature Reserve and between and around the three roosting locations along the Project Area's eastern boundary (BCE 2025). The anticipated RSA assessed by BCE (2025) ranged from 44 m to 206 m (the maximum RSA is 58 m to 220 m; Table 3). Carnaby's cockatoo flights above 44 m comprised 0.40% of all bird time records. Furthermore, these four flights were recorded of single birds flying at 40 m or above and were in the lower areas of the landscape (BCE 2025). - Fork-tailed swifts were not observed or heard during the utilisation survey's Vantage Point or Focal Follow campaigns and have not been detected in decades of biannual surveys at the nearby Cooljarloo Mine (BCE 2025). Fork-tailed swifts are likely to occur very infrequently over the Waddi Wind Farm.

5.3.2.1 Population status

Carnaby's cockatoos are considered to exist as a large interconnected population across five main areas in Western Australia; northern wheatbelt, upper southern wheatbelt, south-eastern wheatbelt and Esperance coast, and the Swan Coastal Plain (DCCEEW 2024o). The total population was estimated to be approximately 40,000 birds in 2010 and declining and estimated to be in the range of 20,000 to 52,000 birds with a best estimate of 34,000 birds in 2020 (DCCEEW 2024o, Birdlife International 2022).

During the site utilisation survey (BCE 2025), Carnaby's cockatoo occurred in larger flocks of 20-50 birds during winter and early spring, and flock sizes diminished into summer when it is thought the Carnaby's cockatoos moved to over-wintering areas. The maximum flock size of 52 birds was relatively small compared to other areas in the region for the same period, including up to 300 birds near Cooljarloo, up to 300 birds near Badgingarra, and 400 birds near Ledge Point. A high number of Carnaby's cockatoo sightings were in the lower landscape along the Project Area's eastern boundary, with occasional forays of smaller groups across higher ground in the south and centre (BCE 2025). The larger flocks of Carnaby's cockatoo were recorded near an identified roost area in the north-eastern portion of the Project Area's (Figure M and Figure N).

Over the last 30 years, Carnaby's cockatoos have been recorded regularly at the nearby Cooljarloo Mine, with frequent observations of flocks with over 100 birds and occasionally flocks of up to 700 birds (BCE 2025). The Cooljarloo Mine is located within 6 km south-west of the Project Area. The larger flocks were observed during winter. The Carnaby's cockatoo appear to be present within and proximate to the Project Area throughout the breeding season (i.e. late winter to early summer), with breeding recorded at a few locations such as the Minyulo Brook Reserve on the Project Area's eastern boundary. It has not been determined if the Carnaby's cockatoos individuals are present all year, or if there is a turnover in individuals. As such, it is uncertain whether the Carnaby's cockatoos are breeding and non-breeding visitors or are resident breeders.

BCE (2025) estimated the population of Carnaby's cockatoos using the Project Area by considering five of the six roost areas used by birds that visit the Project Area, according to observed flight activities collected from August 2024 to January 2025, and assuming that all five roost areas were used simultaneously and were occupied by different birds. BCE found that the late winter and spring population would be approximately 86 Carnaby's cockatoos, and as large as 100 – 120 individual birds when allowing for some underestimation of the number of birds at dusk or dawn. Full demographics of a population were present during the survey period (August 2024 to January 2025) over a 10,491-ha survey area, including adults of both sexes, sub-adults and a fledgling.

Murdoch University researchers identified Carnaby's cockatoo night-roost locations and tracked flock movements in the vicinity of the Project Area from satellite tags attached to 14 individual Carnaby's cockatoos from five separate tag deployments in 2017, 2021 and 2022 (i.e. releases of rehabilitated cockatoos with tags attached) (Murdoch University 2024; Appendix F). The GPS data and site observations at the Cataby breeding area identified a flock of 40 birds, indicating approximately 20 breeding pairs utilising the site. During the post-fledging period (December through March), Carnaby's cockatoos occupying the Cataby breeding area (within 6 – 12 km south and beyond the Project Area) continued to use the surrounding main roosts for several months and increased in numbers (up to 200 birds) as Carnaby's cockatoo arrived from other breeding areas with newly fledged young (Murdoch University 2024). A likely source of these birds was the Moora breeding area, approximately 35 km east of the Project Area, as research has found inland breeding Carnaby's cockatoos generally move towards the coast to forage with fledged young (Figure 8). The increase in flock size may also have been contributed to by birds from the southern breeding areas, such as the Regans Ford breeding area, which indicates connectivity between Regans Ford flocks and the greater Cataby area.

Locations of the Carnaby's cockatoo flock observations are illustrated in Figure M.

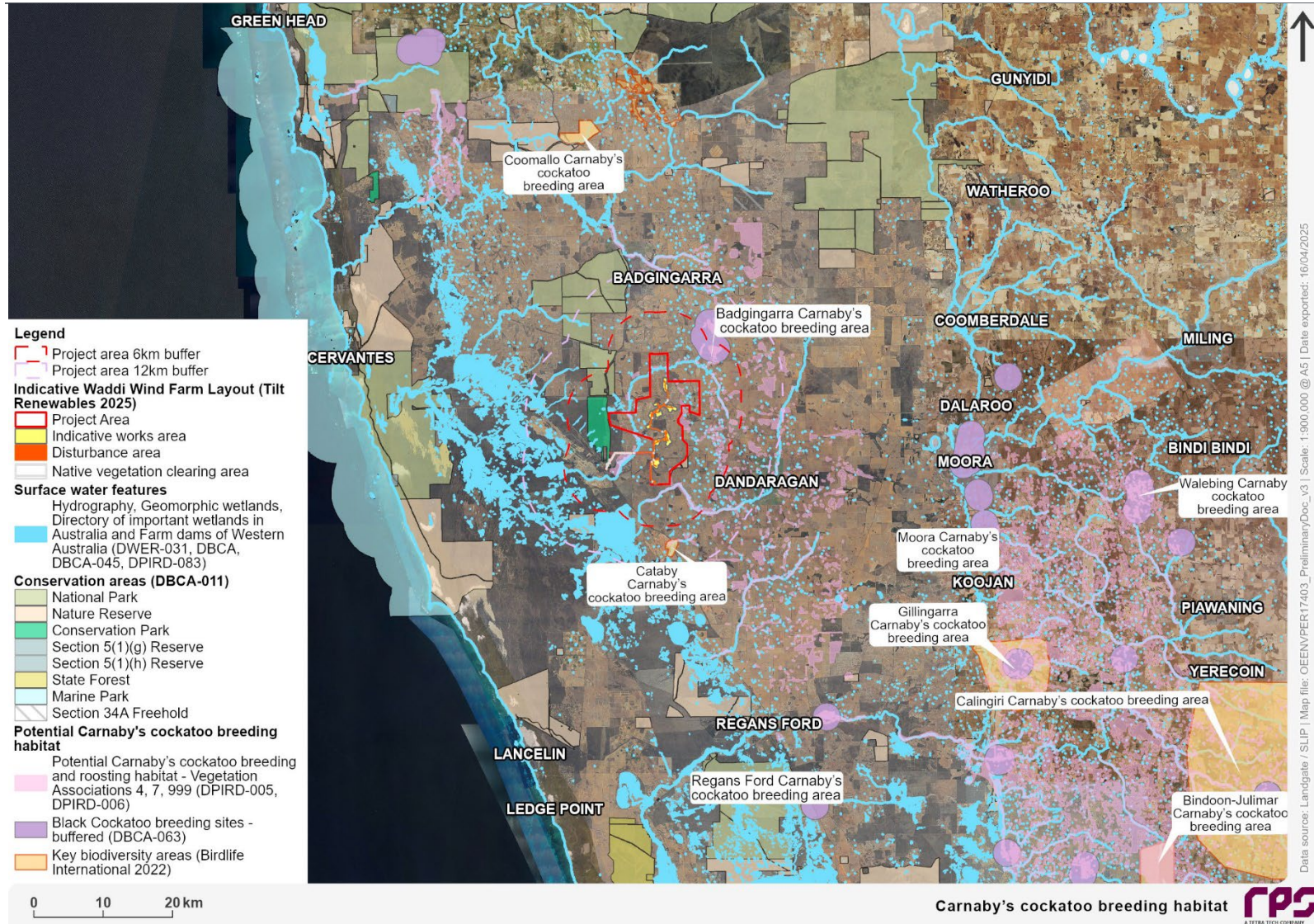


Figure 8: Known Carnaby's cockatoo breeding areas in relation to the Project Area

5.3.2.2 Potential roosting, breeding and foraging habitat summary

Site specific Carnaby's cockatoo surveys and assessments undertaken from 2008 to 2025 across survey extents of 13.6 ha, 97.7 ha, 1,450.5 ha and 10,493.7 ha for the Project Area (see Table 13) identified Carnaby's cockatoo potential roosting, breeding and foraging habitat within the Project Area. Within and beyond the Project Area, there is potential roosting, breeding and foraging habitat for Carnaby's cockatoo broadly indicated by government mapped Native Vegetation Extent dataset (DPIRD-005) intersected by Vegetation Associations (DPIRD-006) where the vegetation descriptions are characteristic of potential habitat. The vegetation association mapping provides a broad indication as it has not been specifically surveyed for Carnaby's cockatoo roosting, breeding or foraging values, and it does not account for habitat quality or specific preferences (e.g., proximity to water sources and foraging areas). The potential roosting, breeding and foraging habitat for Carnaby's cockatoo within 12 km of the Project Area is illustrated in Figure N and Figure O.

Table 14 presents a summary of Carnaby's cockatoo potential roosting, breeding and foraging habitat identified at increasing scales. This includes scales of the Native Vegetation Clearing Area, Disturbance Area, Project Area, 6 km of the Project Area, the local area (12 km of the Project Area) and the regional area (the Lesueur Sandplain subregion and Dandaragan Plateau of the Geraldton Sandplains IBRA bioregion, the Perth subregion of the Swan Coastal Plain IBRA bioregion). Subsequent subsections provide detailed assessments of the Carnaby's cockatoo potential roosting, breeding and foraging habitat within the Project Area, within a 12 km radius (outside of the Project Area) and assesses the Project Area's habitat importance in a local, regional and national context. Table 15 presents the proportion of Carnaby's cockatoo potential roosting, breeding and foraging habitat identified in Native Vegetation Clearing Area compared to increasing scales.

As presented in Table 14, there are substantial extents of potential roosting, breeding and foraging habitat available for Carnaby's cockatoo outside the Project Area; up to 6 km, up to 12 km and in the wider Lesueur Sandplain, Dandaragan Plateau and Perth IBRA subregions. As such, the foraging, potential roosting and potential breeding habitat for Carnaby's cockatoo found within the Project Area is not considered significant compared to the extents of quality potential roosting, breeding and foraging habitat present in the landscape.

Table 14: Carnaby’s cockatoo potential roosting, breeding and foraging habitat identified at increasing scales

Carnaby’s cockatoo habitat	Native Vegetation Clearing Area (5.5 ha)	Disturbance Area (138.4 ha)	Project Area (10,493.7 ha)	Within 6 km of the Project Area (60,578.6 ha)	Local area (Within 12 km of the Project Area) (126,477.8 ha)	Regional area Lesueur Sandplain subregion of the Geraldton Sandplains IBRA bioregion (1,172,152 ha) Dandaragan Plateau subregion of the Geraldton Sandplains IBRA bioregion (383,465 ha) Perth subregion of the Swan Coastal Plain IBRA bioregion (1,142,332 ha)
Potential roosting habitat (Figure N)	13 tall trees identified as potential roosting habitat; 3 marri* trees and 10 pine** trees (Terrestrial Ecosystems 2022). Within a 1,450.5 ha survey area 0.50 ha of government mapped Native Vegetation Extent (DPIRD-005) intersected by Vegetation Associations 7 (DPIRD-006), where its vegetation descriptions are characteristic of potential roosting habitat for Carnaby’s cockatoo. Its key roosting features would be emergent York gum, salmon gum, and wandoo trees (DAWE 2022)	36 tall trees identified as potential roosting habitat; 3 marri* trees, 1 dead tree, 21 pine** trees and 11 planted*** trees (Terrestrial Ecosystems 2022). Within a 1,450.5 ha survey area 0.50 ha of government mapped Native Vegetation Extent (DPIRD-005) intersected by Vegetation Associations 7 (DPIRD-006)	964 tall trees identified as potential roosting habitat; 78 coastal blackbutt, 51 marri* trees, 1 dead tree, 2 native Eucalypt sp. trees, 89 pine** trees and 743 planted*** trees (Terrestrial Ecosystems 2022). Within a 1,450.5 ha survey area 1 roost area (over 300 ha in size; maximum number of birds observed in the roost at dusk was approximately 52 birds) (BCE 2025). One roost area in the Project Area’s north-eastern extent. Within a 10,493.7 ha survey area 77.01 ha of government mapped Native Vegetation Extent (DPIRD-005) intersected by Vegetation Associations 7 (DPIRD-006)	979 tall trees identified as potential roosting habitat; 78 coastal blackbutt, 66 marri* trees, 1 dead tree, 2 native Eucalypt sp. trees, 89 pine** trees and 743 planted*** trees (Terrestrial Ecosystems 2022). Within a 1,450.5 ha survey area 6 roost areas (approximately 150 – 530 ha in size; maximum number of birds observed in the roost at dusk was approximately 1 to 52 birds) (BCE 2025). One roost area in the Project Area’s north-eastern extent, three roost areas to the east and north-east within 6 km of the Project Area, and two roost areas to the south-east partially over 6 km of the Project Area 8 separate night-roost sites (Murdoch University 2024). Located to the north, west, south-west and south of the Project Area 1,693.36 ha of government mapped Native Vegetation Extent (DPIRD-005) intersected by Vegetation Associations 4, 7 and 999 (DPIRD-006), where its vegetation descriptions are characteristic of potential roosting habitat for Carnaby’s cockatoo. Its key roosting features would be emergent York gum, salmon gum, wandoo, marri and jarrah trees (DAWE 2022)	979 tall trees identified as potential roosting habitat; 78 coastal blackbutt, 66 marri* trees, 1 dead tree, 2 native Eucalypt sp. trees, 89 pine** trees and 743 planted*** trees (Terrestrial Ecosystems 2022). Within a 1,450.5 ha survey area 6 roost areas (approximately 150 – 530 ha in size; maximum number of birds observed in the roost at dusk was approximately 1 to 52 birds) (BCE 2025). One roost area in the Project Area’s north-eastern extent, three roost areas to the east and north-east within 6 km of the Project Area, and two roost areas to the south-east partially over 6 km of the Project Area 14 separate night-roost sites (Murdoch University 2024). Located to the north, north-west, west, south-west and south of the Project Area 3,872.07 ha of government mapped Native Vegetation Extent (DPIRD-005) intersected by Vegetation Associations 4, 7 and 999 (DPIRD-006)	979 tall trees identified as potential roosting habitat; 78 coastal blackbutt, 66 marri* trees, 1 dead tree, 2 native Eucalypt sp. trees, 89 pine** trees and 743 planted*** trees (Terrestrial Ecosystems 2022). Within a 1,450.5 ha survey area 6 roost areas (approximately 150 – 530 ha in size; maximum number of birds observed in the roost at dusk was approximately 1 to 52 birds) (BCE 2025). One roost area in the Project Area’s north-eastern extent, three roost areas to the east and north-east within 6 km of the Project Area, and two roost areas to the south-east partially within 6 km of the Project Area 14 separate night-roost sites (Murdoch University 2024). Located to the north, north-west, west, south-west and south of the Project Area - Within the Shire of Dandaragan (671,600 ha) which overlaps both IBRA subregions, the 2022 roost count of white-tailed cockatoos identified 200 birds at a Hill River roost, 282 birds at a Jurien Bay roost and 527 birds at a Dandaragan roost (Pryor, Barrett and Williams 2023). Likely to be Carnaby’s cockatoo, as the area is outside of the Baudin’s cockatoos’ modelled distribution (DAWE 2022) 3,911.46 ha of government 2018 statewide vegetation statistics for Vegetation Associations 4, 7 and 999 in the Lesueur Sandplain subregion (Government of Western Australia 2019) 10,560.45 ha of government 2018 statewide vegetation statistics for Vegetation Association 4, 7 and 999 in the Dandaragan Plateau subregion (Government of Western Australia 2019) 2,083.09 ha of government 2018 statewide vegetation statistics for Vegetation Association 4 and 999 for Perth subregion (Government of Western Australia 2019) - The vegetation statistics provides an indication of the extent and conservation protection of potential

Carnaby's cockatoo habitat	Native Vegetation Clearing Area (5.5 ha)	Disturbance Area (138.4 ha)	Project Area (10,493.7 ha)	Within 6 km of the Project Area (60,578.6 ha)	Local area (Within 12 km of the Project Area) (126,477.8 ha)	Regional area Lesueur Sandplain subregion of the Geraldton Sandplains IBRA bioregion (1,172,152 ha) Dandaragan Plateau subregion of the Geraldton Sandplains IBRA bioregion (383,465 ha) Perth subregion of the Swan Coastal Plain IBRA bioregion (1,142,332 ha)
Potential breeding habitat (Figure N)	3 marri* trees with DBHs of over 500 mm, none of which contained suitable hollows for breeding Carnaby's cockatoos (Terrestrial Ecosystems 2022). Located proximate to the Mullering Brook. Within a 1,450.5 ha survey area. 0.50 ha of government mapped Native Vegetation Extent (DPIRD-005) intersected by Vegetation Associations 7 (DPIRD-006), where its vegetation descriptions are characteristic of suitable breeding habitat for Carnaby's cockatoo. Its key breeding features would be emergent York gum, salmon gum, and wandoo trees with suitable hollows (DAWE 2022). Suitable hollows can take up to 200 years or longer to naturally develop.	3 marri* trees with DBHs of over 500 mm, none of which contained suitable hollows for breeding Carnaby's cockatoos (Terrestrial Ecosystems 2022). Located proximate to the Mullering Brook. Within a 1,450.5 ha survey area. 0.50 ha of government mapped Native Vegetation Extent (DPIRD-005) intersected by Vegetation Associations 7 (DPIRD-006).	2 potential nesting trees (wandoo or marri) with chewed hollows consistent with nesting Carnaby's cockatoos in the Project Area's north-eastern extent (BCE 2025). Within a 10,493.7 ha survey area 51 marri trees with DBHs of over 500 mm, of which 7 marri trees contained suitable hollows for breeding Carnaby's cockatoos (Terrestrial Ecosystems 2022). Majority of marri trees located proximate to the Mullering Brook. Within a 1,450.5 ha survey area. 77.01 ha of government mapped Native Vegetation Extent (DPIRD-005) intersected by Vegetation Associations 7 (DPIRD-006).	- One confirmed nesting tree (large dead wandoo) with a breeding pair and fledgling observed and one potential nesting tree (wandoo or marri) with chewed hollows consistent with nesting Carnaby's cockatoos (BCE 2025). Located immediately adjacent to the Project Area's eastern boundary along Minyulo Brook. Two potential nesting trees (wandoo or marri) with chewed hollows, located in the Project Area's north-eastern extent. Within a 10,493.7 ha survey area 66 marri trees with DBHs of over 500 mm, of which 7 marri trees contained suitable hollows for breeding Carnaby's cockatoos (Terrestrial Ecosystems 2022). Majority of marri trees located proximate to the Mullering Brook. Within a 1,450.5 ha survey area. - Includes the Badgingarra breeding area. 18 confirmed and 2 potential white tailed black cockatoo breeding sites (DBCA 2019). Majority of records to the north-east and along Minyulo Brook. Likely to be used by Carnaby's cockatoo, as the area is outside of the Baudin's cockatoos' modelled distribution (DAWE 2022) 1,693.36 ha of government mapped Native Vegetation Extent (DPIRD-005) intersected by Vegetation Associations 4, 7 and 999 (DPIRD-006), where its vegetation descriptions are characteristic of suitable breeding habitat for Carnaby's cockatoo. Its key breeding features would be emergent York gum, salmon gum, and wandoo, marri and jarrah trees with suitable hollows (DAWE 2022)	- One confirmed nesting tree (large dead wandoo) with a breeding pair and fledgling observed and one potential nesting tree (wandoo or marri) with chewed hollows consistent with nesting Carnaby's cockatoos (BCE 2025). Located immediately adjacent to the Project Area's eastern boundary along Minyulo Brook. Two potential nesting trees (wandoo or marri) with chewed hollows, located in the Project Area's north-eastern extent. Within a 10,493.7 ha survey area 66 marri trees with DBHs of over 500 mm, of which 7 marri trees contained suitable hollows for breeding Carnaby's cockatoos (Terrestrial Ecosystems 2022). Majority of marri trees located proximate to the Mullering Brook. Within a 1,450.5 ha survey area. - Includes these breeding areas; Cataby (key biodiversity area; 320 ha in size) and Badgingarra. 90 confirmed and 6 potential white tailed black cockatoo breeding sites (DBCA 2019). Majority of records to the north-east, south and along Minyulo Brook. Likely to be used by Carnaby's cockatoo, as the area is outside of the Baudin's cockatoos' modelled distribution (DAWE 2022) 3,872.07 ha of government mapped Native Vegetation Extent (DPIRD-005) intersected by Vegetation Associations 4, 7 and 999 (DPIRD-006).	- One confirmed nesting tree (large dead wandoo) with a breeding pair and fledgling observed and one potential nesting tree (wandoo or marri) with chewed hollows consistent with nesting Carnaby's cockatoos (BCE 2025). Located immediately adjacent to the Project Area's eastern boundary along Minyulo Brook. Two potential nesting trees (wandoo or marri) with chewed hollows, located in the Project Area's north-eastern extent. Within a 10,493.7 ha survey area 66 marri trees with DBHs of over 500 mm, of which 7 marri trees contained suitable hollows for breeding Carnaby's cockatoos (Terrestrial Ecosystems 2022). Majority of marri trees located proximate to the Mullering Brook. Within a 1,450.5 ha survey area. - Includes these breeding areas; Cataby (key biodiversity area; 320 ha in size), Badgingarra, Coomallo Creek (key biodiversity area; 1,123 ha in size), Northern Swan Coastal Plain (key biodiversity area; 235,006 ha in size). 90 confirmed and 6 potential white tailed black cockatoo breeding sites (DBCA 2019). Majority of records to the north-east, south and along Minyulo Brook. Likely to be used by Carnaby's cockatoo, as the area is outside of the Baudin's cockatoos' modelled distribution (DAWE 2022) 3,911.46 ha of government 2018 statewide vegetation statistics for Vegetation Associations 4, 7 and 999 in the Lesueur Sandplain subregion (Government of Western Australia 2019) 10,560.45 ha of government 2018 statewide vegetation statistics for Vegetation Association 4, 7 and 999 in the Dandaragan Plateau subregion (Government of Western Australia 2019)

Carnaby's cockatoo habitat	Native Vegetation Clearing Area (5.5 ha)	Disturbance Area (138.4 ha)	Project Area (10,493.7 ha)	Within 6 km of the Project Area (60,578.6 ha)	Local area (Within 12 km of the Project Area) (126,477.8 ha)	Regional area Lesueur Sandplain subregion of the Geraldton Sandplains IBRA bioregion (1,172,152 ha) Dandaragan Plateau subregion of the Geraldton Sandplains IBRA bioregion (383,465 ha) Perth subregion of the Swan Coastal Plain IBRA bioregion (1,142,332 ha)
						2,083.09 ha of government 2018 statewide vegetation statistics for Vegetation Association 4 and 999 for Perth subregion (Government of Western Australia 2019) - The vegetation statistics provides an indication of the extent and conservation protection of potential Carnaby's cockatoo breeding habitat within the IBRA subregions. It likely underrepresents the amount of potential Carnaby's cockatoo breeding habitat available, as other vegetation associations would provide suitable breeding habitat for the species.
Potential foraging habitat (Figure O)	13 tall trees identified as potential foraging habitat; 3 marri* trees and 10 pine** trees (Terrestrial Ecosystems 2022). Within a 1,450.5 ha survey area 5.33 ha of surveyed native vegetation types have been identified as potential Carnaby's cockatoo foraging habitat (RPS 2023, Ecologia Environment 2016, Outback Ecology 2014). This included proteaceous heath, banksia low open woodland, marri (<i>Corymbia calophylla</i>) woodland and coastal blackbutt (<i>Eucalyptus todtiana</i>) woodland vegetation types 4.74 ha of government mapped Native Vegetation Extent (DPIRD-005) intersected by Vegetation Associations 7, 1030 and 1031 (DPIRD-006), where its vegetation descriptions are characteristic of suitable foraging habitat for Carnaby's cockatoo. Its key foraging features would be seeds, flowers and nectar of native proteaceous plant species in native heathland and woodland (DAWE 2022)	35 tall trees identified as potential roosting habitat; 3 marri* trees, 21 pine** trees and 11 planted*** trees (Terrestrial Ecosystems 2022). Within a 1,450.5 ha survey area 5.33 ha of surveyed native vegetation types have been identified as potential Carnaby's cockatoo foraging habitat (RPS 2023, Ecologia Environment 2016, Outback Ecology 2014). This included proteaceous heath, banksia low open woodland, marri (<i>Corymbia calophylla</i>) woodland and coastal blackbutt (<i>Eucalyptus todtiana</i>) woodland vegetation types 4.74 ha of government mapped Native Vegetation Extent (DPIRD-005) intersected by Vegetation Associations 7, 1030 and 1031 (DPIRD-006).	963 tall trees identified as potential roosting habitat; 78 coastal blackbutt, 51 marri* trees, 2 native Eucalypt sp. trees, 89 pine** trees and 743 planted*** trees (Terrestrial Ecosystems 2022). Within a 1,450.5 ha survey area 83.33 ha of surveyed native vegetation types have been identified as potential Carnaby's cockatoo foraging habitat (RPS 2023, Ecologia Environment 2016, Outback Ecology 2014). This included proteaceous heath, banksia low open woodland, marri (<i>Corymbia calophylla</i>) woodland and coastal blackbutt (<i>Eucalyptus todtiana</i>) woodland vegetation types 7 foraging signs (chew-marks) located in the larger extents of native vegetation in the Project Area (Figure O) (BCE 2025) 1,068.68 ha of government mapped Native Vegetation Extent (DPIRD-005) intersected by Vegetation Associations 7, 1030 and 1031 (DPIRD-006).	978 tall trees identified as potential roosting habitat; 78 coastal blackbutt, 66 marri* trees, 2 native Eucalypt sp. trees, 89 pine** trees and 743 planted*** trees (Terrestrial Ecosystems 2022). Within a 1,450.5 ha survey area 148.87 ha of surveyed native vegetation types have been identified as potential Carnaby's cockatoo foraging habitat (RPS 2023, Ecologia Environment 2016, Outback Ecology 2014). This included proteaceous heath, banksia low open woodland, marri (<i>Corymbia calophylla</i>) woodland and coastal blackbutt (<i>Eucalyptus todtiana</i>) woodland vegetation types 16 foraging signs (chew-marks) located in the larger extents of native vegetation in and surrounding the Project Area (BCE 2025) 16,284.32 ha of government mapped Native Vegetation Extent (DPIRD-005) intersected by Vegetation Associations 4, 7, 999, 1030, 1031 and 1035 (DPIRD-006).	978 tall trees identified as potential roosting habitat; 78 coastal blackbutt, 66 marri* trees, 2 native Eucalypt sp. trees, 89 pine** trees and 743 planted*** trees (Terrestrial Ecosystems 2022). Within a 1,450.5 ha survey area 148.87 ha of surveyed native vegetation types have been identified as potential Carnaby's cockatoo foraging habitat (RPS 2023, Ecologia Environment 2016, Outback Ecology 2014). This included proteaceous heath, banksia low open woodland, marri (<i>Corymbia calophylla</i>) woodland and coastal blackbutt (<i>Eucalyptus todtiana</i>) woodland vegetation types 16 foraging signs (chew-marks) located in the larger extents of native vegetation in and surrounding the Project Area (Figure O) (BCE 2025) 40,284.77ha of government mapped Native Vegetation Extent (DPIRD-005) intersected by Vegetation Associations 4, 7, 999, 1030, 1031 and 1035 (DPIRD-006).	978 tall trees identified as potential roosting habitat; 78 coastal blackbutt, 66 marri* trees, 2 native Eucalypt sp. trees, 89 pine** trees and 743 planted*** trees (Terrestrial Ecosystems 2022). Within a 1,450.5 ha survey area 148.87 ha of surveyed native vegetation types have been identified as potential Carnaby's cockatoo foraging habitat (RPS 2023, Ecologia Environment 2016, Outback Ecology 2014). This included proteaceous heath, banksia low open woodland, marri (<i>Corymbia calophylla</i>) woodland and coastal blackbutt (<i>Eucalyptus todtiana</i>) woodland vegetation types 16 foraging signs (chew-marks) located in the larger extents of native vegetation in and surrounding the Project Area (BCE 2025) 90,052.48 ha of government 2018 statewide vegetation statistics for Vegetation Associations 4, 7, 999, 1030, 1031 and 1035 in the Lesueur Sandplain subregion (Government of Western Australia 2019) 22,273.65 ha of government 2018 statewide vegetation statistics for Vegetation Associations 4, 7, 999, 1030, 1031 and 1035 in the Dandaragan Plateau subregion (Government of Western Australia 2019) 82,096.20 ha of government 2018 statewide vegetation statistics for Vegetation Associations 4, 999, 1030, 1031 and 1035 for Perth subregion (Government of Western Australia 2019)

Carnaby's cockatoo habitat	Native Vegetation Clearing Area (5.5 ha)	Disturbance Area (138.4 ha)	Project Area (10,493.7 ha)	Within 6 km of the Project Area (60,578.6 ha)	Local area (Within 12 km of the Project Area) (126,477.8 ha)	Regional area Lesueur Sandplain subregion of the Geraldton Sandplains IBRA bioregion (1,172,152 ha) Dandaragan Plateau subregion of the Geraldton Sandplains IBRA bioregion (383,465 ha) Perth subregion of the Swan Coastal Plain IBRA bioregion (1,142,332 ha)
						The vegetation statistics provides an indication of the extent and conservation protection of potential Carnaby's cockatoo foraging habitat within the IBRA subregions. It likely underrepresents the amount of potential Carnaby's cockatoo foraging habitat available, as other vegetation associations would provide potential roosting habitat for the species.

* Up to 3 marri trees are expected to be lost; 1 marri tree within the Native Vegetation Clearing Area and 2 marri trees recorded marginally outside the Native Vegetation Clearing Area however aerial imagery shows that the 2 marri trees are within the Native Vegetation Clearing Area.

** Includes at least 10 pines trees, informed by a review of an unsurveyed extent of the Disturbance Area in August 2023. The planted trees were found to be primarily planted pine trees (at least 10) and one planted non-endemic Eucalypt tree (RPS and Tilt Renewables 2023).

*** Includes at least 1 planted tree, informed by a review of an unsurveyed extent of the Disturbance Area in August 2023. The planted trees were found to be primarily planted pine trees (at least 10) and one planted non-endemic Eucalypt tree (RPS and Tilt Renewables 2023).

Table 15: Proportion of Carnaby's cockatoo potential roosting, breeding and foraging habitat identified in Native Vegetation Clearing Area compared to increasing scales

Carnaby's cockatoo habitat	Native Vegetation Clearing Area (5.5 ha)	Disturbance Area (138.4 ha)	Project Area (10,493.7 ha)	Within 6 km of the Project Area (60,578.6 ha)	Local area (Within 12 km of the Project Area) (126,477.8 ha)	Regional area Lesueur Sandplain subregion of the Geraldton Sandplains IBRA bioregion (1,172,152 ha) Dandaragan Plateau subregion of the Geraldton Sandplains IBRA bioregion (383,465 ha) Perth subregion of the Swan Coastal Plain IBRA bioregion (1,142,332 ha)
Potential roosting habitat (Figure N)	13 tall trees identified as potential roosting habitat; 3 marri* trees and 10 pine** trees (Terrestrial Ecosystems 2022). Within a 1,450.5 ha survey area 0.50 ha of government mapped Native Vegetation Extent (DPIRD-005) intersected by Vegetation Associations 7 (DPIRD-006), where its vegetation descriptions are characteristic of potential roosting habitat for Carnaby's cockatoo. Its key roosting features would be emergent York gum, salmon gum, and wandoo trees (DAWE 2022)	36% of the tall trees identified as potential roosting habitat (Terrestrial Ecosystems 2022) 100% of government mapped Native Vegetation Extent (DPIRD-005) intersected by Vegetation Associations 7 (DPIRD-006)	1.35% of the tall trees identified as potential roosting habitat (Terrestrial Ecosystems 2022) 0.66% of government mapped Native Vegetation Extent (DPIRD-005) intersected by Vegetation Associations 7 (DPIRD-006)	1.33% of the tall trees identified as potential roosting habitat (Terrestrial Ecosystems 2022) 0.03% of government mapped Native Vegetation Extent (DPIRD-005) intersected by Vegetation Associations 4, 7 and 999 (DPIRD-006)	1.33% of the tall trees identified as potential roosting habitat (Terrestrial Ecosystems 2022) 0.01% of government mapped Native Vegetation Extent (DPIRD-005) intersected by Vegetation Associations 4, 7 and 999 (DPIRD-006)	1.33% of the tall trees identified as potential roosting habitat (Terrestrial Ecosystems 2022) 0.003% of government 2018 statewide vegetation statistics for Vegetation Associations 4, 7 and 999 in the Lesueur Sandplain subregion, the Dandaragan Plateau subregion and the Perth subregion (Government of Western Australia 2019)
Potential breeding habitat (Figure N)	3 marri* trees with DBHs of over 500 mm, none of which contained suitable hollows for breeding Carnaby's cockatoos (Terrestrial Ecosystems 2022). Located proximate to the Mullering Brook. Within a 1,450.5 ha survey area. 0.50 ha of government mapped Native Vegetation Extent (DPIRD-005) intersected by Vegetation Associations 7 (DPIRD-006), where its vegetation descriptions are characteristic of suitable breeding habitat for Carnaby's cockatoo. Its key breeding features would be emergent York gum, salmon gum, and wandoo trees with suitable hollows (DAWE 2022). Suitable hollows can take up to 200 years or longer to naturally develop.	100% of marri* trees with DBHs of over 500 mm (Terrestrial Ecosystems 2022). 100% of government mapped Native Vegetation Extent (DPIRD-005) intersected by Vegetation Associations 7 (DPIRD-006)	5.88% of marri* trees with DBHs of over 500 mm (Terrestrial Ecosystems 2022). 0.66% of government mapped Native Vegetation Extent (DPIRD-005) intersected by Vegetation Associations 7 (DPIRD-006)	4.55% of marri* trees with DBHs of over 500 mm (Terrestrial Ecosystems 2022). 0.03% of government mapped Native Vegetation Extent (DPIRD-005) intersected by Vegetation Associations 4, 7 and 999 (DPIRD-006)	4.55% of marri* trees with DBHs of over 500 mm (Terrestrial Ecosystems 2022). 0.01% of government mapped Native Vegetation Extent (DPIRD-005) intersected by Vegetation Associations 4, 7 and 999 (DPIRD-006)	4.55% of marri* trees with DBHs of over 500 mm (Terrestrial Ecosystems 2022). 0.003% of government 2018 statewide vegetation statistics for Vegetation Associations 4, 7 and 999 in the Lesueur Sandplain subregion, the Dandaragan Plateau subregion and the Perth subregion (Government of Western Australia 2019)
Potential foraging habitat (Figure O)	13 tall trees identified as potential foraging habitat; 3 marri* trees and 10 pine** trees (Terrestrial Ecosystems 2022). Within a 1,450.5 ha survey area	36% of the tall trees identified as potential roosting habitat (Terrestrial Ecosystems 2022)	1.35% of the tall trees identified as potential roosting habitat (Terrestrial Ecosystems 2022)	1.33% of the tall trees identified as potential roosting habitat (Terrestrial Ecosystems 2022)	1.33% of the tall trees identified as potential roosting habitat (Terrestrial Ecosystems 2022)	1.33% of the tall trees identified as potential roosting habitat (Terrestrial Ecosystems 2022)

Carnaby's cockatoo habitat	Native Vegetation Clearing Area (5.5 ha)	Disturbance Area (138.4 ha)	Project Area (10,493.7 ha)	Within 6 km of the Project Area (60,578.6 ha)	Local area (Within 12 km of the Project Area) (126,477.8 ha)	Regional area Lesueur Sandplain subregion of the Geraldton Sandplains IBRA bioregion (1,172,152 ha) Dandaragan Plateau subregion of the Geraldton Sandplains IBRA bioregion (383,465 ha) Perth subregion of the Swan Coastal Plain IBRA bioregion (1,142,332 ha)
	5.33 ha of surveyed native vegetation types have been identified as potential Carnaby's cockatoo foraging habitat (RPS 2023, Ecologia Environment 2016, Outback Ecology 2014). This included proteaceous heath, banksia low open woodland, marri (<i>Corymbia calophylla</i>) woodland and coastal blackbutt (<i>Eucalyptus tottiana</i>) woodland vegetation types 4.74 ha of government mapped Native Vegetation Extent (DPIRD-005) intersected by Vegetation Associations 7, 1030 and 1031 (DPIRD-006), where its vegetation descriptions are characteristic of suitable foraging habitat for Carnaby's cockatoo. Its key foraging features would be seeds, flowers and nectar of native proteaceous plant species in native heathland and woodland (DAWE 2022)	100% of government mapped Native Vegetation Extent (DPIRD-005) intersected by Vegetation Associations 7, 1030 and 1031 (DPIRD-006)	0.44% of government mapped Native Vegetation Extent (DPIRD-005) intersected by Vegetation Associations 7, 1030 and 1031 (DPIRD-006)	0.03% of government mapped Native Vegetation Extent (DPIRD-005) intersected by Vegetation Associations 4, 7, 999, 1030, 1031 and 1035 (DPIRD-006)	0.01% of government mapped Native Vegetation Extent (DPIRD-005) intersected by Vegetation Associations 4, 7, 999, 1030, 1031 and 1035 (DPIRD-006)	0.002% of government 2018 statewide vegetation statistics for Vegetation Associations 4, 7, 999, 1030, 1031 and 1035 in the Lesueur Sandplain subregion, the Dandaragan Plateau subregion and the Perth subregion (Government of Western Australia 2019)

5.3.2.3 Roosting habitat assessment

5.3.2.3.1 Project Area context

Within the Project Area, Carnaby's cockatoo roosting habitat has been identified by BCE (2025) and Terrestrial Ecosystems (2022), and government mapping provides a broad indication of potential roosting habitat for Carnaby's cockatoo. Potential Carnaby's cockatoo roosting habitat is illustrated in Figure N and comprised:

- 964 tall trees identified as potential roosting habitat; 78 coastal blackbutt, 51 marri trees, 1 dead tree, 2 native Eucalypt sp. trees, 89 pine trees and 743 planted trees (Terrestrial Ecosystems 2022). Within a 1,450.5 ha survey area.
- One roost area (over 300 ha in size; maximum number of birds observed in the roost at dusk was approximately 52 birds) (BCE 2025). One roost area in the Project Area's north-eastern extent. Within a 10,493.7 ha survey area.
- 77.01 ha of government mapped Native Vegetation Extent (DPIRD-005) intersected by Vegetation Associations 7 (DPIRD-006), where its vegetation descriptions are characteristic of potential roosting habitat for Carnaby's cockatoo. Its key roosting features would be emergent York gum, salmon gum, and wandoo trees (DAWE 2022)

The following sections provide a detailed assessment of the Carnaby's cockatoo potential roosting habitat within the Project Area from the site-specific surveys and government mapping.

5.3.2.3.1.1 Carnaby's cockatoo and fork-tailed swift utilisation survey (BCE 2025)

During the 2024-2025 site utilisation survey (BCE 2025; Appendix C), six roost areas were identified by the presence of Carnaby's cockatoos active at dusk and in the same location during the following sunrise. Areas separated by more than 500 m were considered separate roosts. One roost area is located within the Project Area, in its north-eastern extent (Figure N). Carnaby's cockatoos were actively using roost areas within and adjacent to the Project Area's eastern boundary during each survey visit. Carnaby's cockatoo flocks congregating to roosting areas were highly dynamic, and trees used for roosting would change between nights. It remains unclear whether individual birds show fidelity to specific roosts or whether they move readily between roosts over different nights or during each season (BCE 2025). Selection of roosting grounds can change depending on resource availability.

The roost area identified by BCE (2025) in the Project Area's north-eastern extent is considered a key roosting area, as it was confirmed as active on multiple visits from August 2024 to January 2025.

5.3.2.3.1.2 Black-cockatoo habitat assessment (Terrestrial Ecosystems 2022)

Terrestrial Ecosystems (2022; Appendix H) undertook a Carnaby's cockatoo habitat assessment over a 1,450.5 ha survey area which followed the (then) Disturbance Area between 2021 and 2022, noting the vegetation type and estimating the height of the upper stratum. The GPS location of all tall trees was recorded (except for pine trees), which were over 8 m tall for most species, and over 6 m tall for coastal blackbutt. The potential roosting resources for Carnaby's cockatoos within the Project Area boundary include 964 tall trees; 78 coastal blackbutt, 51 marri trees, 1 dead tree, 2 native Eucalypt sp. trees, 89 pine trees and 743 planted trees. The tall trees were recorded along a north-south orientation in the Project Area and along the proposed transmission line, where most of the marri trees were located proximate to Mullering Brook (Figure N). Of these tall trees, there were 10 pine trees and 1 planted tree (non-endemic Eucalypt) which were identified during a review of an unsurveyed extent of the (then) Disturbance Area (RPS and Tilt Renewables 2023).

Any tall tree can provide roosting habitat for Carnaby's cockatoo, particularly marri, introduced eucalypts and introduced pines (DAWE 2022). A key roosting area was identified by BCE (2025) in the Project Area's north-eastern extent, as it was confirmed active on multiple visits from August 2024 to January 2025. This roosting area is located over 1 km from the closest turbine (WTG 14). BCE (2024) did not observe roosting activities at the tall trees identified by Terrestrial Ecosystems (2022).

Therefore, the potential roosting habitat presented by the 964 tall trees within the Project Area are less likely to be utilised by Carnaby's cockatoo compared to the key roost area located in the Project Area's north-eastern extent (BCE 2025).

5.3.2.3.1.3 Native Vegetation Extent (DPIRD-005) and Vegetation Associations (DPIRD-006)

Across the Project Area, potential roosting habitat for Carnaby's cockatoo is described for Vegetation Association 7 (Medium woodland; York gum (*Eucalyptus loxophleba*) and wandoo) (Shepherd et al. 2002 and Beard et al. 2013). Its key roosting features would be emergent York gum, salmon gum, and wandoo trees (DAWE 2022). The vegetation association mapping provides a broad indication of potential roosting habitat for Carnaby's cockatoo as it has not been specifically surveyed for roosting values, and it does not account for habitat quality or specific preferences (e.g., proximity to water sources and foraging areas).

There is approximately 77.01 ha of government mapped Native Vegetation Extent (DPIRD-005) intersected by Vegetation Associations 7 (DPIRD-006) in the Project Area. This potential roosting habitat within the Project Area is less likely to be utilised by Carnaby's cockatoo than the key roost area located in the Project Area's north-eastern extent (BCE 2025).

5.3.2.3.1.4 Water resources

Night-roosting locations are generally in or near riparian environments or natural and artificial permanent water sources, usually within 2 km, and require proximity to foraging resources (DAWE 2022). Reliable access to water in close proximity is likely a characteristic associated with Carnaby's cockatoo's preferred roost sites (Le Roux 2017). Carnaby's cockatoos opportunistically use available natural and artificial water sources, and usually drink in the morning, often immediately prior to a day-time rest period, and immediately prior to roosting at night (Groom 2015). The species requires access to reliable sources of clean and fresh water, which are permanent to seasonally available. It is assumed that Carnaby's cockatoo prefer calm and slow flowing water resources, over fast and deep flowing watercourses, due to abundant observations of Carnaby's cockatoos drinking from streams, swamps, lakes, dams, stock troughs, bird baths, puddles and in cemetery vases (Berry 2008, Groom 2015, Le Roux 2017).

Water sources within the Project Area include Mullering Brook and farm dams (Figure N):

- Mullering Brook is a tributary of Hill River and is recharged by surface water flows and groundwater (DWER 2018). Mullering Brook receives groundwater discharge from the confined Yarragadee aquifer as baseflow, springs and pools upstream of the Project Area and from the unconfined superficial aquifer found along the Mullering Brook valley (Department of Water 2017). Limited sampling along Mullering Brook in 2008 and 2021 identified an average pH of 7.06 and an average salinity of 7,802 uS/cm electrical conductivity, which is indicative of neutral and brackish water (DWER 2025b). The typical salinity of freshwater is 0 – 1,500 uS/cm. Water in the Mullering Brook is seasonally dependent on rainfall and shallow groundwater levels and its water quality may not always be fresh.
- Farm dams are recharged by surface water flows and potentially by groundwater, and Carnaby's cockatoos have been observed foraging on canola crops within 50 m of a farm dam and a flock of 10 birds were observed moving from trees in creek line to a water trough, next to farm shed (BCE 2025).

Therefore, Mullering Brook, farm dams and water troughs within the Project Area may support Carnaby's cockatoos roosting habitat when containing freshwater.

5.3.2.3.2 Local 12 km context (outside of the Project Area)

Within 12 km of the Project Area, Carnaby's cockatoo roosting habitat has been identified by BCE (2025) and Murdoch University (2024), and government mapping provides a broad indication of potential roosting habitat for Carnaby's cockatoo. Potential Carnaby's cockatoo roosting habitat within 6 km and 12 km of the Project Area is illustrated in Figure N and Figure 9 and comprised:

- 15 tall trees identified as potential roosting habitat; 15 marri trees (Terrestrial Ecosystems 2022). Within a 1,450.5 ha survey area
- 5 roost areas (approximately 150 – 530 ha in size; maximum number of birds observed in the roost at dusk was approximately 1 to 20 birds) (BCE 2025). Three roost areas to the east and north-east within 6 km of the Project Area, and two roost areas to the south-east partially over 6 km of the Project Area

- 14 separate night-roost sites (Murdoch University 2024). Located to the north, north-west, west, south-west and south of the Project Area.
- 3,795.06 ha of government mapped Native Vegetation Extent (DPIRD-005) intersected by Vegetation Associations 4, 7 and 999 (DPIRD-006). Its key roosting features would be emergent York gum, salmon gum, wandoo, marri and jarrah trees (DAWE 2022)

The following sections provide a detailed assessment of the Carnaby's cockatoo potential roosting habitat within a 12 km radius (outside of the Project Area) from the site-specific surveys and government mapping.

The potential and confirmed roosting habitat present in the Project Area (Section 5.3.2.3) is considered to be less important to Carnaby's cockatoos than the larger extents of potential and confirmed roosting habitat available at a local context.

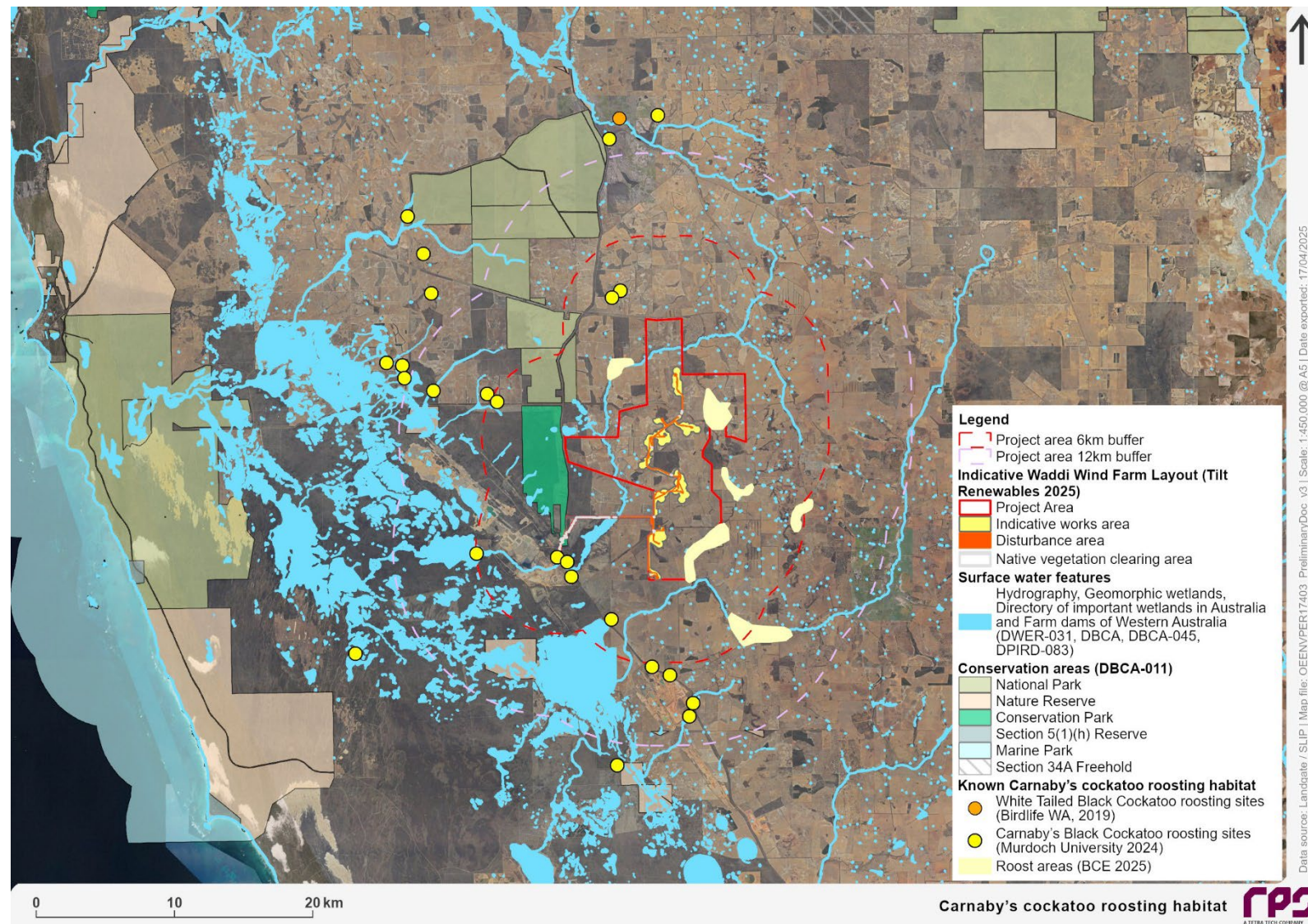


Figure 9: Carnaby's cockatoo potential roosting habitat within 12 km of the Project Area

5.3.2.3.2.1 Carnaby's cockatoo and fork-tailed swift utilisation survey (BCE 2025)

Night-roosting locations are generally in or near riparian environments or natural and artificial permanent water sources, usually within 2 km, and require proximity to foraging resources (DAWE 2022). The optimal daily foraging range from nests / roosts is 6 km, and the upper limit of daily foraging range from nests / roosts is 12 km (DAWE 2022, Murdoch University 2024). During the non-breeding season, Carnaby's cockatoos mainly forage in areas up to 20 km from a known night roosting habitat (DAWE 2022). Large roosts are formed during mid-spring during the breeding season, however non-breeding birds use similar roosts throughout the year.

During the 2024-2025 site utilisation survey (BCE 2025; Appendix C), six roost areas were identified by the presence of Carnaby's cockatoos active at dusk and in the same location during the following sunrise. Areas separated by more than 500 m were considered separate roosts. Five roost areas are located within 12 km of the Project Area, primarily within 6 km (Figure N and Figure 9). Carnaby's cockatoos were actively using roost areas within and adjacent to the Project Area's eastern boundary during each survey visit. Carnaby's cockatoos observed flying towards Mullering Brook at VP04, therefore a roost north of the Waddi Bush Resort's roost area is suspected.

The five roost areas identified by BCE (2025) within 12 km of the Project Area are considered key roosting areas, as the two roost areas just east of the Project Area were confirmed as active on multiple visits from August 2024 to January 2025 and the three remaining roost areas to the south-east and north-west were confirmed as active during at least one visit.

5.3.2.3.2.2 Black cockatoo tracking data (Murdoch University 2024)

Murdoch University researchers identified Carnaby's cockatoo night-roost locations and tracked flock movements in the vicinity of the Project Area from satellite tags attached to 14 individual Carnaby's cockatoos from five separate tag deployments (i.e. releases of rehabilitated cockatoos with tags attached) (Murdoch University 2024; Appendix F). The known night-roost locations for Carnaby's cockatoo roosts within an approximate mean daily foraging distance (6 km) and an approximate maximum daily foraging distance (12 km) of the Project Area are presented in Figure 9. Roost locations were identified using data obtained from satellite tags during the period that tags remained operational on 'marker birds' in each flock (typically a few weeks). Separate roost sites were defined using a distance of greater than 500 m. (i.e. roost locations within 500 m of each other were considered to be a single roost site). Eight separate night-roost sites are located within 6 km of the Project Area and an additional six roost sites are within 12 km.

The 14 roost sites recorded by Murdoch University (2024) within 12 km of the Project Area are considered key roost sites in a local 12 km context as they were confirmed to be used by tracked Carnaby's cockatoo flocks.

5.3.2.3.2.3 Black-cockatoo habitat assessment (Terrestrial Ecosystems 2022)

The potential roosting resources for Carnaby's cockatoos within the Project Area boundary include 15 tall marri trees (Terrestrial Ecosystems 2022). The marri trees were located proximate to the Mullering Brook. This potential roosting habitat within 12 km of the Project Area is less likely to be utilised by Carnaby's cockatoo than known roost locations, such as the five roost areas and 14 roost sites in the local 12 km context (BCE 2025, Murdoch University 2022).

5.3.2.3.2.4 Native Vegetation Extent (DPIRD-005) and Vegetation Associations (DPIRD-006)

Within 12 km of the Project Area, potential roosting habitat for Carnaby's cockatoo is described for three vegetation associations (Shepherd et al. 2002 and Beard et al. 2013).

- Vegetation Association 4 (Medium woodland; marri & wandoo). Its key roosting features would be emergent wandoo, marri and jarrah trees (DAWE 2022)
- Vegetation Association 7 (Medium woodland; York gum (*Eucalyptus loxophleba*) and wandoo). Its key roosting features would be emergent York gum, salmon gum and wandoo trees (DAWE 2022)
- Vegetation Association 999 (Medium woodland; marri). Its key roosting features would be emergent wandoo, marri and jarrah trees (DAWE 2022)

There is approximately 3795.06 ha of government mapped Native Vegetation Extent (DPIRD-005) intersected by Vegetation Associations 4, 7 and 999 (DPIRD-006) within 12 km of the Project Area. The vegetation association mapping provides a broad indication of potential roosting habitat for Carnaby's cockatoo as it has not been specifically surveyed for roosting values, and it does not account for habitat quality or specific preferences (e.g., proximity to water sources and foraging areas).

There is over 80 ha of potential Carnaby's cockatoo roosting habitat within conservation estates identified within 12 km of the Project Area, Minyulo Nature Reserve (86 ha) (Figure N and Figure 9). One roost area is located within Minyulo Nature Reserve, whereas the other roosts or roost areas identified by BCE (2025) and Murdoch University (2024) are not located within conservation estates or Crown reserves. Potential Carnaby's cockatoo roosting habitat within conservation areas represents critical habitat for the species (BCE 2025).

This potential roosting habitat within 12 km of the Project Area is less likely to be utilised by Carnaby's cockatoo than known roost locations, such as the five roost areas and 14 roost sites in the local 12 km context (BCE 2025, Murdoch University 2022).

5.3.2.3.2.5 Water resources

Water sources within 12 km of the Project Area include Mullering Brook, Minyulo Brook, wetlands and farm dams (Figure N and Figure 9):

- Mullering Brook is a tributary of Hill River and is recharged by surface water flows and groundwater (DWER 2018). Mullering Brook receives groundwater discharge from the confined Yarragadee aquifer as baseflow, springs and pools upstream of the Project Area and from the unconfined superficial aquifer found along the Mullering Brook valley (Department of Water 2017). Limited sampling along Mullering Brook in 2008 and 2021 identified an average pH of 7.06 and an average salinity of 7,802 uS/cm electrical conductivity, which is indicative of neutral and brackish water (DWER 2025b). The typical salinity of freshwater is 0 – 1,500 uS/cm. Water in the Mullering Brook is seasonally dependent on rainfall and shallow groundwater levels and its water quality may not always be fresh.
- Minyulo Brook is a tributary of Nambung River and is recharged by surface water flows and groundwater (DWER 2018). Minyulo Brook receives groundwater discharge from the unconfined superficial aquifer found along the Minyulo Brook valley (Department of Water 2017). Limited sampling along Minyulo Brook in 2008 and 2021 identified an average pH of 7.86 and an average salinity of 4,451 uS/cm electrical conductivity, which is indicative of neutral and brackish water (DWER 2025b). The typical salinity of freshwater is 0 – 1,500 uS/cm. Water in the Minyulo Brook is seasonally dependent on rainfall and shallow groundwater levels and its water quality may not always be fresh.
- Farm dams are also recharged by surface water flows and shallow groundwater levels. There are several wetlands located to the east and west of the Project Area, including two permanently inundated wetlands (Douaraba Swamp and an unnamed lake) which both intersect Minyulo Brook, seasonally inundated wetlands (sumplands, floodplains, creeks), intermittent inundated wetlands (barlkarra) and seasonally waterlogged wetlands (dampland, palusplain) (Department of Environment and Conservation 2012). The water quality of the farm dams and wetlands is unknown.

Therefore, Mullering Brook, Minyulo Brook, wetlands, farm dams and water troughs within 12 km of the Project Area may support Carnaby's cockatoos roosting when containing freshwater.

5.3.2.3.3 Regional context

The 12 km radius of the Project Area extends over three IBRA subregions, the Lesueur Sandplain subregion and Dandaragan Plateau subregion of the Geraldton Sandplains IBRA bioregion and the Perth subregion of the Swan Coastal Plain IBRA bioregion. Within the three IBRA subregions, potential roosting habitat for Carnaby's cockatoo is described for three vegetation associations (Shepherd et al. 2002 and Beard et al. 2013).

- Vegetation Association 4 (Medium woodland; marri & wandoo). Its key roosting features would be emergent wandoo, marri and jarrah trees (DAWE 2022)
- Vegetation Association 7 (Medium woodland; York gum (*Eucalyptus loxophleba*) and wandoo). Its key roosting features would be emergent York gum, salmon gum and wandoo trees (DAWE 2022)

- Vegetation Association 999 (Medium woodland; marri). Its key roosting features would be emergent wandoo, marri and jarrah trees (DAWE 2022)

The vegetation association mapping provides a broad indication of potential roosting habitat for Carnaby's cockatoo as it has not been specifically surveyed for roosting values, and it does not account for habitat quality or specific preferences (e.g., proximity to water sources and foraging areas). The vegetation statistics provides an indication of the extent and conservation protection of potential Carnaby's cockatoo roosting habitat within the IBRA subregions. It likely underrepresents the amount of potential Carnaby's cockatoo roosting habitat available, as other vegetation associations would provide potential roosting habitat for the species.

Within the three IBRA subregions, there is approximately:

- 3,911.46 ha of government 2018 statewide vegetation statistics for Vegetation Associations 4, 7 and 999 in the Lesueur Sandplain subregion (Government of Western Australia 2019)
- 10,560.45 ha of government 2018 statewide vegetation statistics for Vegetation Association 4, 7 and 999 in the Dandaragan Plateau subregion (Government of Western Australia 2019)
- 2,083.09 ha of government 2018 statewide vegetation statistics for Vegetation Association 4 and 999 for Perth subregion (Government of Western Australia 2019)

There is over 1,000 ha of potential Carnaby's cockatoo roosting habitat within conservation estates in the three IBRA subregions for Vegetation Associations 4, 7 and 999. Potential Carnaby's cockatoo roosting habitat within conservation areas represents critical habitat for the species (BCE 2025).

Within the Shire of Dandaragan (671,600 ha) which overlaps the IBRA subregions, the 2022 roost count of white-tailed cockatoos identified 200 birds at a Hill River roost, 282 birds at a Jurien Bay roost and 527 birds at a Dandaragan roost (Pryor, Barrett and Williams 2023). The latter site was considered the fourth largest roost of 2022 of white-tailed cockatoos in the regional areas, in which over 2,000 white-tailed cockatoos have been recorded at the roost from 2012 to 2022. The birds were likely to be Carnaby's cockatoo, as the Shire of Dandaragan is outside of the Baudin's cockatoos' modelled distribution (DAWE 2022).

The potential roosting habitat within the regional context is less likely to be utilised by Carnaby's cockatoo than known roost locations, such as the five roost areas and 14 roost sites in the local 12 km context (BCE 2025, Murdoch University 2022) and the 3 active roost sites recorded in 2022 in the Shire of Dandaragan (Pryor, Barrett and Williams 2023).

The potential and confirmed roosting habitat present in the Project Area (Section 5.3.2.3) is considered to be less important to Carnaby's cockatoos than the larger extents of potential and confirmed roosting habitat available at a regional context.

5.3.2.3.4 National context

Carnaby's cockatoo are endemic to the south-west of Western Australia and are not found elsewhere in the world. Within Western Australia, potential roosting habitat for Carnaby's cockatoo is described for three vegetation associations (Shepherd et al. 2002 and Beard et al. 2013); Vegetation Associations 4, 7 and 999. The vegetation association mapping provides a broad indication of potential roosting habitat for Carnaby's cockatoo as it has not been specifically surveyed for roosting values, and it does not account for habitat quality or specific preferences (e.g., proximity to water sources and foraging areas). The vegetation statistics provides an indication of the extent and conservation protection of potential Carnaby's cockatoo roosting habitat within the IBRA subregions. It likely underrepresents the amount of potential Carnaby's cockatoo roosting habitat available, as other vegetation associations would provide potential roosting habitat for the species.

Within Western Australia, there is approximately 320,012.20 ha of government 2018 statewide vegetation statistics for Vegetation Associations 4, 7 and 999 (Government of Western Australia 2019). There is over 46,800 ha of potential Carnaby's cockatoo roosting habitat within conservation estates in Western Australia for Vegetation Associations 4, 7 and 999. Potential Carnaby's cockatoo roosting habitat within conservation areas represents critical habitat for the species (BCE 2025).

Within Western Australia, the 2022 roost count of white-tailed cockatoos identified 1 to 5,032 birds at occupied roosts, with an average of 185 birds + 49 birds (standard error) and a median of 56 birds from 115 roosts (Pryor, Barrett and Williams 2023). These birds would have been Carnaby's cockatoo and Baudin's cockatoo. There were 244 confirmed white-tailed cockatoos roosts recorded in 2022.

The potential roosting habitat within the national context is less likely to be utilised by Carnaby's cockatoo than known roost locations, such as the five roost areas and 14 roost sites in the local 12 km context (BCE 2025, Murdoch University 2022) and the 3 active roost sites recorded in 2022 in the Shire of Dandaragan, and 244 active roost sites recorded in 2022 for white-tailed cockatoos in Western Australia (Pryor, Barrett and Williams 2023).

The potential and confirmed roosting habitat present in the Project Area (Section 5.3.2.3) is considered to be less important to Carnaby's cockatoos than the larger extents of potential and confirmed roosting habitat available at a national context.

5.3.2.4 Breeding habitat assessment

5.3.2.4.1 Project Area context

Within the Project Area, Carnaby's cockatoo potential breeding habitat and evidence has been identified by BCE (2025) and Terrestrial Ecosystems (2022), and government mapping provides a broad indication of potential breeding habitat for Carnaby's cockatoo. Potential Carnaby's cockatoo breeding habitat and records of Carnaby's cockatoo breeding evidence is illustrated in Figure N and comprised:

- 2 potential nesting trees (wandoo or marri) with chewed hollows consistent with nesting Carnaby's cockatoos in the Project Area's north-eastern extent (BCE 2025). Within a 10,493.7 ha survey area
- 51 marri trees with DBHs of over 500 mm, of which 7 marri trees contained suitable hollows for breeding Carnaby's cockatoos (Terrestrial Ecosystems 2022). Majority of marri trees located proximate to the Mullering Brook. Within a 1,450.5 ha survey area.
- 77.01 ha of government mapped Native Vegetation Extent (DPIRD-005) intersected by Vegetation Associations 7 (DPIRD-006), where its vegetation descriptions are characteristic of suitable breeding habitat for Carnaby's cockatoo. Its key breeding features would be emergent York gum, salmon gum, and wandoo trees with suitable hollows (DAWE 2022). Suitable hollows can take up to 200 years or longer to naturally develop.

Appendix V provides the available information (e.g, species name, size) on confirmed and potential breeding trees within the Project Area. The following sections provide a detailed assessment of the Carnaby's cockatoo potential breeding habitat within the Project Area from the site-specific surveys and government mapping.

5.3.2.4.1.1 Carnaby's cockatoo and fork-tailed swift utilisation survey (BCE 2025)

During the 2024-2025 site utilisation survey (BCE 2025; Appendix C), three potential nesting trees and one confirmed nesting tree was identified, of which two potential nesting trees were located within the Project Area's north-eastern extent (Figure N). The potential nesting trees recorded were Wandoo and / or Marri trees with chewed hollows consistent with nesting Carnaby's cockatoos in woodland north of Waddi Road. The 2024 breeding season was reported to either be depressed or late (Ron Johnson pers. comm. 2024). The principal cause of this was considered to be failure in flowering food plant species caused by hot temperatures and prolonged drought in the summer of 2023/2024. In future years, more nesting behaviour may occur.

The two potential nesting trees identified by BCE (2025) in the Project Area's north-eastern extent are considered key potential nesting trees, as they had chewed hollows which shows it has been used by Carnaby's cockatoo.

5.3.2.4.1.2 Black-cockatoo habitat assessment (Terrestrial Ecosystems 2022)

Terrestrial Ecosystems (2022; Appendix H) undertook a Carnaby's cockatoo habitat assessment over a 1,450.5 ha survey area which followed the (then) Disturbance Area between 2021 and 2022, noting the vegetation type and estimating the height of the upper stratum. All potential Carnaby's cockatoo breeding trees (i.e. eucalypts with a DBH of greater than 500 mm) had their DBH measured and any eucalypt trees with hollows of suitable dimensions for a Carnaby's cockatoo nesting site were noted and the hollow(s) dimensions recorded. The previous DCCEEW black cockatoo guidance (i.e. revised draft referral guideline for three threatened black cockatoo species 2017 and EPBC Act referral guidelines for three threatened black cockatoo species 2012) were current during the primary survey period by Terrestrial Ecosystems

(October 2021). Potential breeding habitat was identified in relation to preceding guidance, which stated that for most species a suitable DBH is 500 mm with only salmon gum and wandoo trees being subject to the 300 mm limit. There were no salmon gum or wandoo trees identified by Terrestrial Ecosystem's (2022) assessment within the (then) Disturbance Area.

The potential breeding resources for Carnaby's cockatoos within the Project Area included the 51 marri trees with DBHs of over 500 mm, of which 7 marri trees contained suitable hollows for breeding Carnaby's cockatoos (Terrestrial Ecosystems 2022). The majority of marri trees located proximate to the Mullering Brook. A few of the suitable and smaller hollows in the marri trees were occupied by bee hives / corella (Terrestrial Ecosystems 2022). The three marri trees near Mullering Brook proposed to be permanently lost do not have hollows, hence are potential breeding habitat for Carnaby's cockatoo.

Other tall trees recorded comprised of native Eucalypt sp. trees with DBH of under 500 mm, planted trees, pines and coastal blackbutt (*Eucalyptus tottiana*). Pine trees are not known to form hollows, hence are not considered a breeding resource. Coastal blackbutt trees are not known to be used by Carnaby's cockatoo for breeding, however they are a known foraging species (Groom 2011). Planted non-native eucalypt trees are comprised of tree species that do not typically form hollows nor provide a foraging resource (Terrestrial Ecosystems 2022).

The potential breeding habitat presented by the 51 marri trees, of which 7 marri trees contained suitable hollows for breeding Carnaby's cockatoos, within the Project Area are less likely to be utilised by Carnaby's cockatoo compared to the potential nesting trees identified by BCE (2025) located in the Project Area's north-eastern extent (BCE 2025). This is due to the presence of hollow competitors (bees, corellas), that there was no evidence of use, and that Carnaby's cockatoos are known to have a strong site fidelity with nesting hollows (BCE 2025).

5.3.2.4.1.3 Native Vegetation Extent (DPIRD-005) and Vegetation Associations (DPIRD-006)

Across the Project Area, potential breeding habitat for Carnaby's cockatoo is described for Vegetation Association 7 (Medium woodland; York gum (*Eucalyptus loxophleba*) and wandoo) (Shepherd et al. 2002 and Beard et al. 2013). Its key breeding features would be emergent York gum, salmon gum, and wandoo trees with suitable hollows (DAWE 2022). Suitable hollows can take up to 200 years or longer to naturally develop. The vegetation association mapping provides a broad indication of potential breeding habitat for Carnaby's cockatoo as it has not been specifically surveyed for breeding values, and it does not account for habitat quality or specific preferences (e.g., proximity to water sources and foraging areas).

There is approximately 77.01 ha of government mapped Native Vegetation Extent (DPIRD-005) intersected by Vegetation Associations 7 (DPIRD-006) in the Project Area. This potential breeding habitat within the Project Area is less likely to be utilised by Carnaby's cockatoo compared to the potential nesting trees identified by BCE (2025) located in the Project Area's north-eastern extent (BCE 2025).

5.3.2.4.1.4 Water resources

Proximity to water resources is important for breeding Carnaby's cockatoo (DAWE 2022). As stated above, Mullering Brook and the farm dams within the Project Area may support Carnaby's cockatoos breeding habitat when containing freshwater.

5.3.2.4.2 Local 12 km context (outside of the Project Area)

Within 12 km of the Project Area, Carnaby's cockatoo breeding habitat and evidence have been identified by BCE (2025), Murdoch University (2024) and DBCA, and government mapping provides a broad indication of potential breeding habitat for Carnaby's cockatoo. Potential Carnaby's cockatoo breeding habitat and records of Carnaby's cockatoo breeding evidence within 6 km and 12 km of the Project Area is illustrated in Figure N and comprised:

- One confirmed nesting tree (large dead wandoo) with a breeding pair and fledgling observed and one potential nesting tree (wandoo or marri) with chewed hollows consistent with nesting Carnaby's cockatoos (BCE 2025). Located immediately adjacent to the Project Area's eastern boundary along Minyulo Brook. Within a 10,493.7 ha survey area
- 15 marri trees with DBHs of over 500 mm, of which 4 marri trees contained suitable hollows for breeding Carnaby's cockatoos (Terrestrial Ecosystems 2022). Majority of marri trees located proximate to the Mullering Brook. Within a 1,450.5 ha survey area.

- Includes these breeding areas; Cataby (key biodiversity area; 320 ha in size) and Badgingarra.
- 81 confirmed and 5 potential white tailed black cockatoo breeding sites (DBCA 2019). Majority of records to the north-east, south and along Minyulo Brook. Likely to be used by Carnaby's cockatoo, as the area is outside of the Baudin's cockatoos' modelled distribution (DAWE 2022)
- 3,795.06 ha of government mapped Native Vegetation Extent (DPIRD-005) intersected by Vegetation Associations 4, 7 and 999 (DPIRD-006).

Appendix V provides the available information (e.g, species name, size) on confirmed and potential breeding trees within 12 km of the Project Area. The following sections provide a detailed assessment of the Carnaby's cockatoo potential breeding habitat within a 12 km radius (outside of the Project Area) from the site-specific surveys and government mapping.

The potential breeding habitat present in the Project Area (Section 5.3.2.4) is considered to be less important to Carnaby's cockatoos than the larger extents of potential and confirmed breeding habitat and trees available at a local context.

5.3.2.4.2.1 Carnaby's cockatoo and fork-tailed swift utilisation survey (BCE 2025)

Carnaby's cockatoos mainly forage in areas up to 12 km from a nest in a known nesting tree during the breeding season, relying on the proximity of foraging resources to successfully raise chicks (DAWE 2022). The optimal daily foraging range from nests / roosts is 6 km, and the upper limit of daily foraging range from nests / roosts is 12 km (DAWE 2022, Murdoch University 2024). Proximity to water resources is important for breeding Carnaby's cockatoo and they require suitable nest hollows in live or dead trees whose DBH is at least 300 mm.

During the 2024-2025 site utilisation survey (BCE 2025; Appendix C), one confirmed nesting tree (large dead wandoo) with a breeding pair and fledgling observed and one potential nesting tree (wandoo or marri) with chewed hollows consistent with nesting Carnaby's cockatoos was identified (BCE 2025). The confirmed nesting tree and potential nesting tree are located immediately adjacent to the Project Area's eastern boundary along Minyulo Brook (Figure N). The confirmed nesting tree recorded was a large dead wandoo tree, with a nesting pair of Carnaby's cockatoos observed at the nest in a hollow spout successfully raising a fledgling. This was despite the breeding pair being visited frequently by western corellas, which were highly vocal when the Carnaby's cockatoos entered or exited the nest (Plate 1). The female Carnaby's cockatoo was observed to have almost no feathers on their head, which could have been common, caused by rubbing against the tree or due to harassment by the western corellas. The observation of western corellas harassing Carnaby's cockatoos is consistent with reports from local farmers, and Terrestrial Ecosystems (2022) identified that around half of the marri trees which had hollows of suitable dimensions to provide a current nesting site for Carnaby's cockatoo along Mullering Brook were occupied by bee hives / corella.

The one confirmed and one potential nesting trees identified by BCE (2025) in the Project Area's north-eastern extent are considered key potential nesting trees, as the confirmed nesting tree was in active use, and the potential nesting tree had chewed hollows which shows it has been used by Carnaby's cockatoo. The confirmed nesting tree is the closest record to the Project Area, located approximately 30 m to the east.



(Source: BCE 2025)

Plate 1: Confirmed Carnaby's cockatoo nest with parent inside tree hollow on 7 October 2024 and western corellas observed frequently harassing parent birds

5.3.2.4.2.2 Black cockatoo tracking data (Murdoch University 2024)

Satellite tags data obtained by Murdoch University (2024; Appendix F) from tags deployed at the Cataby Carnaby's cockatoo breeding area, combined with real-time field observations at the breeding area, indicate that during the period of nestling provisioning, most foraging occurred in a southerly direction from the main breeding area, with the closest recorded foraging occurring within 6 km of the Project Area. Carnaby's cockatoo have been observed foraging on a combination of proteaceous vegetation and exotic species including canola and wild radish (Murdoch University 2024). The Project Area has two known breeding areas for Carnaby's cockatoos within 12 km of the Project Area, the Cataby and the Badgingarra breeding areas (Figure 8).

In addition to potentially providing foraging and roosting habitat for birds at the closest of these breeding areas (those within the 12 km daily foraging range), the Project Area may function as a connectivity corridor for birds from the other breeding areas, as well as breeding populations further afield in the Wheatbelt when those flocks move to the coastal banksia and other key foraging areas across the Swan Coastal Plain in the weeks after breeding, with their dependent fledglings (Murdoch University 2024). The satellite data and field

observations for the Cataby breeding area during the post-fledging period show that Carnaby's cockatoos continued to use the main roosts around the breeding area for up to several months after nestlings fledged (December to March), and significantly, over this time the number of birds increased as birds arrived from other breeding areas with newly fledged young (Murdoch University 2024). The Moora breeding area is one likely source of these additional birds, as it is located directly east of the Cataby breeding area. Research has found that inland breeding Carnaby's cockatoos generally move towards the coast to spend time at key foraging areas once young have fledged (Murdoch University 2024). Breeding areas further south may also contribute to this flock size increase, including birds from the Regans Ford breeding area (Murdoch University 2024).

The known breeding trees in the Cataby and Badgingarra breeding areas within 12 km of the Project Area are considered key breeding trees in a local 12 km context, which was supported by Murdoch University's (2022) tracked Carnaby's cockatoo flocks at the Cataby breeding area.

5.3.2.4.2.3 Black-cockatoo habitat assessment (Terrestrial Ecosystems 2022)

The potential breeding resources for Carnaby's cockatoos within the Project Area included the 15 marri trees with DBHs of over 500 mm, of which 4 marri trees contained suitable hollows for breeding Carnaby's cockatoos (Terrestrial Ecosystems 2022). The marri trees were located proximate to the Mullering Brook. A few of the suitable and smaller hollows in the marri trees were occupied by bee hives / corella (Terrestrial Ecosystems 2022).

The potential breeding habitat presented by the 15 marri trees, of which 4 marri trees contained suitable hollows for breeding Carnaby's cockatoos, within 12 km of the Project Area are less likely to be utilised by Carnaby's cockatoo compared to known breeding trees, such as the one confirmed nesting tree (BCE 2025), the 81 confirmed white tailed black cockatoo breeding sites (DBCA 2019), and the Cataby (key biodiversity area) and Badgingarra breeding areas located within the 12 km radius of the Project Area.

5.3.2.4.2.4 DBCA records and key biodiversity areas

There are two key biodiversity areas mapped within 12 km radius of the Project Area, which correspond with the Carnaby's cockatoo Cataby breeding area and Badgingarra breeding area (Figure N). The Cataby breeding area supports up to 24 breeding pairs of Carnaby's cockatoo (DPaW 2013) and breeding sites have been mapped by DBCA over the Badgingarra breeding area. There are 81 confirmed and 5 potential white tailed black cockatoo breeding sites recorded by DBCA (2019) (Figure N).

The two breeding areas and 81 confirmed and 5 potential white tailed black cockatoo breeding sites are considered key breeding areas and sites in a local 12 km context, which is supported by the breeding activity recorded by DBCA.

5.3.2.4.2.5 Native Vegetation Extent (DPIRD-005) and Vegetation Associations (DPIRD-006)

Within 12 km of the Project Area, potential breeding habitat for Carnaby's cockatoo is described for three vegetation associations (Shepherd et al. 2002 and Beard et al. 2013):

- Vegetation Association 4 (Medium woodland; marri & wandoo). Its key breeding features would be emergent wandoo, marri and jarrah trees with suitable hollows (DAWE 2022)
- Vegetation Association 7 (Medium woodland; York gum (*Eucalyptus loxophleba*) and wandoo). Its key breeding features would be emergent York gum, salmon gum and wandoo trees with suitable hollows (DAWE 2022)
- Vegetation Association 999 (Medium woodland; marri). Its key breeding features would be emergent wandoo, marri and jarrah trees with suitable hollows (DAWE 2022)

There is approximately 3,795.06 ha of government mapped Native Vegetation Extent (DPIRD-005) intersected by Vegetation Associations 4, 7 and 999 (DPIRD-006) within 12 km of the Project Area. The vegetation association mapping provides a broad indication of potential breeding habitat for Carnaby's cockatoo as it has not been specifically surveyed for breeding values, and it does not account for habitat quality or specific preferences (e.g., proximity to water sources and foraging areas).

There is over 80 ha of potential Carnaby's cockatoo breeding habitat within conservation estates identified within 12 km of the Project Area, such as the Minyulo Nature Reserve (86 ha in size) (Figure N). One potential nesting tree and one confirmed nesting tree were identified within the Minyulo Nature Reserve

(BCE 2025), whereas the DBCA confirmed and potential nesting trees within the Cataby and Badgingarra breeding areas are not located within conservation estates or Crown reserves (Figure N). Most of the confirmed and potential nesting trees are located in rural zoned land (Landgate 2025) and in private landholdings.

This potential breeding habitat within 12 km of the Project Area is less likely to be utilised by Carnaby's cockatoo compared to known breeding trees, such as the one confirmed nesting tree (BCE 2025), the 9 confirmed white tailed black cockatoo breeding sites (DBCA 2019) within 6 km of the Project Area, the 81 confirmed white tailed black cockatoo breeding sites (DBCA 2019), and the Cataby (key biodiversity area) and Badgingarra breeding areas located within the 12 km of the Project Area.

5.3.2.4.2.6 Water resources

Proximity to water resources is important for breeding Carnaby's cockatoo (DAWE 2022). As stated above, Mullering Brook, Minyulo Brook, wetlands and farm dams within 12 km of the Project Area may support Carnaby's cockatoos roosting / breeding when containing freshwater.

5.3.2.4.3 Regional importance

Within the Wheatbelt region, all areas of breeding habitat are critical to Carnaby's cockatoo, as are the associated foraging areas that support breeding (DAWE 2022). Vegetation in this region is fragmented and represented poorly in reserves. Carnaby's cockatoos nest in tree hollows, and it can take up to 200 years or longer to develop suitable hollows (DAWE 2022).

The 12 km radius of the Project Area extends over three IBRA subregions, the Lesueur Sandplain subregion and Dandaragan Plateau subregion of the Geraldton Sandplains IBRA bioregion and the Perth subregion of the Swan Coastal Plain IBRA bioregion. Within the three IBRA subregions, potential breeding habitat for Carnaby's cockatoo is described for three vegetation associations (Shepherd et al. 2002 and Beard et al. 2013).

- Vegetation Association 4 (Medium woodland; marri & wandoo). Its key breeding features would be emergent wandoo, marri and jarrah trees with suitable hollows (DAWE 2022)
- Vegetation Association 7 (Medium woodland; York gum (*Eucalyptus loxophleba*) and wandoo). Its key breeding features would be emergent York gum, salmon gum and wandoo trees with suitable hollows (DAWE 2022)
- Vegetation Association 999 (Medium woodland; marri). Its key breeding features would be emergent wandoo, marri and jarrah trees with suitable hollows (DAWE 2022)

The vegetation association mapping provides a broad indication of potential breeding habitat for Carnaby's cockatoo as it has not been specifically surveyed for breeding values, and it does not account for habitat quality or specific preferences (e.g., proximity to water sources and foraging areas). The vegetation statistics provides an indication of the extent and conservation protection of potential Carnaby's cockatoo breeding habitat within the IBRA subregions. It likely underrepresents the amount of potential Carnaby's cockatoo breeding habitat available, as other vegetation associations would provide suitable breeding habitat for the species.

Within the three IBRA subregions, there is approximately:

- 3,911.46 ha of government 2018 statewide vegetation statistics for Vegetation Associations 4, 7 and 999 in the Lesueur Sandplain subregion (Government of Western Australia 2019)
- 10,560.45 ha of government 2018 statewide vegetation statistics for Vegetation Association 4, 7 and 999 in the Dandaragan Plateau subregion (Government of Western Australia 2019)
- 2,083.09 ha of government 2018 statewide vegetation statistics for Vegetation Association 4 and 999 for Perth subregion (Government of Western Australia 2019)

There is over 1,000 ha of potential Carnaby's cockatoo breeding habitat within conservation estates in the three IBRA subregions for Vegetation Associations 4, 7 and 999. Potential Carnaby's cockatoo breeding habitat within conservation areas represents critical habitat for the species (BCE 2025).

The potential breeding habitat within the regional context is less likely to be utilised by Carnaby's cockatoo compared to known breeding trees, such as the one confirmed nesting tree (BCE 2025), the 9 confirmed white tailed black cockatoo breeding sites (DBCA 2019) within 6 km of the Project Area, the 81 confirmed

white tailed black cockatoo breeding sites (DBCA 2019), and the Cataby (key biodiversity area) and Badgingarra breeding areas located within the 12 km radius of the Project Area.

The potential breeding habitat present in the Project Area (Section 5.3.2.4) is considered to be less important to Carnaby's cockatoos than the larger extents of potential and confirmed breeding habitat and breeding trees available at a regional context.

5.3.2.4.4 National importance

Carnaby's cockatoo are endemic to the south-west of Western Australia and are not found elsewhere in the world. Within Western Australia, potential breeding habitat for Carnaby's cockatoo is described for three vegetation associations (Shepherd et al. 2002 and Beard et al. 2013); Vegetation Associations 4, 7 and 999. The vegetation association mapping provides a broad indication of potential breeding habitat for Carnaby's cockatoo as it has not been specifically surveyed for breeding values, and it does not account for habitat quality or specific preferences (e.g., proximity to water sources and foraging areas). The vegetation statistics provides an indication of the extent and conservation protection of potential Carnaby's cockatoo breeding habitat within the IBRA subregions. It likely underrepresents the amount of potential Carnaby's cockatoo breeding habitat available, as other vegetation associations would provide suitable breeding habitat for the species.

Within Western Australia, there is approximately 320,012.20 ha of government 2018 statewide vegetation statistics for Vegetation Associations 4, 7 and 999 (Government of Western Australia 2019). There is over 46,800 ha of potential Carnaby's cockatoo breeding habitat within conservation estates in Western Australia for Vegetation Associations 4, 7 and 999. Potential Carnaby's cockatoo breeding habitat within conservation areas represents critical habitat for the species (BCE 2025).

The potential and confirmed breeding habitat present in the Project Area (Section 5.3.2.4) is considered to be less important to Carnaby's cockatoos than the larger extents of potential and confirmed breeding habitat and trees available at a national context.

5.3.2.5 Foraging habitat assessment

5.3.2.5.1 Project Area context

Within the Project Area, Carnaby's cockatoo foraging habitat and evidence have been identified by BCE (2025) and Terrestrial Ecosystems (2022), surveyed vegetation types have been identified as potential Carnaby's cockatoo foraging habitat (RPS 2023, Ecologia Environment 2016, Outback Ecology 2014) and government mapping provides a broad indication of potential foraging habitat for Carnaby's cockatoo. Potential Carnaby's cockatoo foraging habitat and records of Carnaby's cockatoo foraging and foraging evidence is illustrated in Figure O and comprised:

- 7 foraging signs (chew-marks) located in the larger extents of native vegetation in the Project Area (Figure O) (BCE 2025)
- 83.33 ha of surveyed native vegetation types have been identified as potential Carnaby's cockatoo foraging habitat (RPS 2023, Ecologia Environment 2016, Outback Ecology 2014). This included proteaceous heath, banksia low open woodland, marri (*Corymbia calophylla*) woodland and coastal blackbutt (*Eucalyptus tottiana*) woodland vegetation types
- 963 tall trees identified as potential roosting habitat; 78 coastal blackbutt, 51 marri trees, 2 native Eucalypt sp. trees, 89 pine trees and 743 planted trees (Terrestrial Ecosystems 2022). Within a 1,450.5 ha survey area
- 1,068.68 ha of government mapped Native Vegetation Extent (DPIRD-005) intersected by Vegetation Associations 7, 1030 and 1031 (DPIRD-006).

Furthermore, within the Project Area crop rotations may include canola and lupins, which Carnaby's cockatoo are known to forage on.

The following sections provide a detailed assessment of the Carnaby's cockatoo potential foraging habitat within the Project Area from the site-specific surveys and government mapping.

5.3.2.5.1.1 Carnaby's cockatoo and fork-tailed swift utilisation survey (BCE 2025)

During the 2024-2025 site utilisation survey (BCE 2025; Appendix C), Carnaby's cockatoos were observed foraging across the Project Area, with characteristic chew marks on hakea, banksia, marri and Pines recorded (Figure O). Carnaby's cockatoos frequently foraged in Banksia heath and Marri woodland, however foraging was also opportunistically observed in cropped paddocks of canola and lupin, and on wild radish as weed species. Often Carnaby's cockatoos were seen foraging on the edges of paddocks (Plate 2) near freshwater sources (a farm dam), particularly in the Project Area's north-eastern extent. Occasionally, Carnaby's cockatoos were seen foraging far within paddocks alongside Western Corellas (*Cacatua pastinator*) and feeding and roosting in pine trees in the south and north of the Project Area.

Key foraging areas in the Project Area included larger extents of native vegetation (hakea, banksia, marri).



(Source: BCE 2025)

Plate 2: Group of 16 Carnaby's cockatoo observed foraging on the perimeter of a crop of canola in the north-eastern roost area, within the Project Area

5.3.2.5.1.2 Flora and vegetation surveys (various)

Vegetation types have been mapped across the Project Area from 2013 to 2023 across survey extents of 13.6 ha, 97.7 ha, and 1,445.0 ha for the Project Area (RPS 2023, Ecologia Environment 2016, Outback Ecology 2014). The native vegetation types which were identified as Carnaby's cockatoo potential foraging habitat included proteaceous heath, banksia low open woodland, marri (*Corymbia calophylla*) woodland and coastal blackbutt (*Eucalyptus tottiana*) woodland. In addition, there were 10 pine trees which were identified during a review of an unsurveyed extent of the (then) Disturbance Area (RPS and Tilt Renewables 2023), as such the pine trees' canopy area was included into the mapped potential foraging habitat in Figure O.

Key foraging areas in the Project Area included larger extents of native vegetation (proteaceous heath, banksia low open woodland, marri (*Corymbia calophylla*) woodland).

5.3.2.5.1.3 Black-cockatoo habitat assessment (Terrestrial Ecosystems 2022)

Terrestrial Ecosystems (2022; Appendix H) undertook a Carnaby's cockatoo habitat assessment over a 1,450.5 ha survey area which followed the (then) Disturbance Area between 2021 and 2022, noting the vegetation types and searching for evidence of past or recent black cockatoo foraging. Terrestrial Ecosystems identified areas of high foraging quality in kwongan proteaceous heath / banksia woodland vegetation, marri trees and pine plantations, and low foraging quality in a substantially burnt pine plantation, planted paddock trees and grasses. These findings are consistent with BCE's (2025) observations of Carnaby's cockatoo foraging on both native and planted vegetation. To determine the quality of foraging habitat, Terrestrial Ecosystems' (2022) applied the foraging scoring tool (DAWE 2022) to all vegetation within the Project Area (excluding planted crops, and paddocks cleared or left as fallow), as follows:

- High foraging quality, scoring 7-8 out of 10
 - Patches of kwongan heath dominated by proteaceous plant species such as *Banksia* spp., *Hakea* spp. and *Grevillea* spp., which are prime foraging habitat for Carnaby's cockatoo (Johnston 2013, DAWE 2022, Murdoch University 2024). This vegetation was present in patches throughout the Project Area
 - A grove of 66 marri trees, which were primarily located along Mullering Brook which intersects the Project Area. Of this, 51 marri trees are located within the Project Area.
- High foraging quality, scoring 5 out of 10
 - Small pine plantations that are well established and provide a potential foraging resource for Carnaby's cockatoo, located along a paddock edge at the centre of the Project Area
- Low foraging quality, scoring 0 out of 10
 - A large pine plantation in the southern part of the Project Area was substantially burnt and many of the trees appeared to be dead. A few of the trees had survived the burn, so there are a few live trees but generally there were none providing current foraging value for Carnaby's cockatoo (due to the fire impacts).
 - Planted paddock trees comprised of mostly non-endemic species, located along paddock fences throughout the Project Area.
 - Grasses.

The Murdoch University (2024) flock movement tracks identify that the portion of the Project Area to the east of the Cooljarloo Mine and west of Brand Highway is frequented by cockatoo flocks with known roosting habitat also proximate to this area. It is very likely that the proteaceous heath / banksia woodland vegetation in this area is used by Carnaby's cockatoo for foraging.

The potential breeding habitat presented by the 51 marri trees within the Project Area are less likely to be utilised by Carnaby's cockatoo compared to the surveyed vegetation types identified as potential Carnaby's cockatoo foraging habitat in patches through the Project Area (RPS 2023, Ecologia Environment 2016, Outback Ecology 2014).

5.3.2.5.1.4 Native Vegetation Extent (DPIRD-005) and Vegetation Associations (DPIRD-006)

Across the Project Area, suitable foraging habitat for Carnaby's cockatoo is described for Vegetation Association 7 (Medium woodland; York gum (*Eucalyptus loxophleba*) and wandoo), Vegetation Association 1030 (Low woodland; *Banksia attenuata* and *Banksia menziesii*) and Vegetation Association 1031 (Mosaic: Shrublands; hakea scrub-heath / Shrublands; dryandra heath) (Shepherd et al. 2002 and Beard et al. 2013). Its key foraging features would be seeds, flowers and nectar of native proteaceous plant species in native heathland and woodland (DAWE 2022). The vegetation association mapping provides a broad indication of potential foraging habitat for Carnaby's cockatoo as it has not been specifically surveyed for foraging values, and it does not account for habitat quality or specific preferences (e.g., proximity to water sources and roost areas).

There is approximately 1,068.68 ha of government mapped Native Vegetation Extent (DPIRD-005) intersected by Vegetation Associations 7, 1030 and 1031 (DPIRD-006) in the Project Area. This potential foraging habitat within the Project Area is as likely to be utilised by Carnaby's cockatoo compared to the surveyed vegetation types identified as potential Carnaby's cockatoo foraging habitat in patches through the Project Area (RPS 2023, Ecologia Environment 2016, Outback Ecology 2014).

5.3.2.5.2 Local 12 km context (outside of the Project Area)

Within 12 km of the Project Area, Carnaby's cockatoo foraging habitat and evidence have been identified by BCE (2025) and Murdoch University (2024), and government mapping provides a broad indication of potential foraging habitat for Carnaby's cockatoo. Potential Carnaby's cockatoo foraging habitat and evidence within 6 km and 12 km of the Project Area is illustrated in Figure O and Figure 10 and comprised:

- 15 tall trees identified as potential foraging habitat; 15 marri trees (Terrestrial Ecosystems 2022). Within a 1,450.5 ha survey area
- 9 foraging signs (chew-marks) located in the larger extents of native vegetation in and surrounding the Project Area (Figure O) (BCE 2025)
- 39,216.09ha of government mapped Native Vegetation Extent (DPIRD-005) intersected by Vegetation Associations 4, 7, 999, 1030, 1031 and 1035 (DPIRD-006). Its key foraging features would be seeds, flowers and nectar of native proteaceous plant species in native heathland and woodland (DAWE 2022)

Furthermore, the 12 km radius of the Project Area is characterised by agricultural land used for grazing (sheep and some cattle) and dryland cropping, which may provide opportunistic foraging resources for Carnaby's cockatoo.

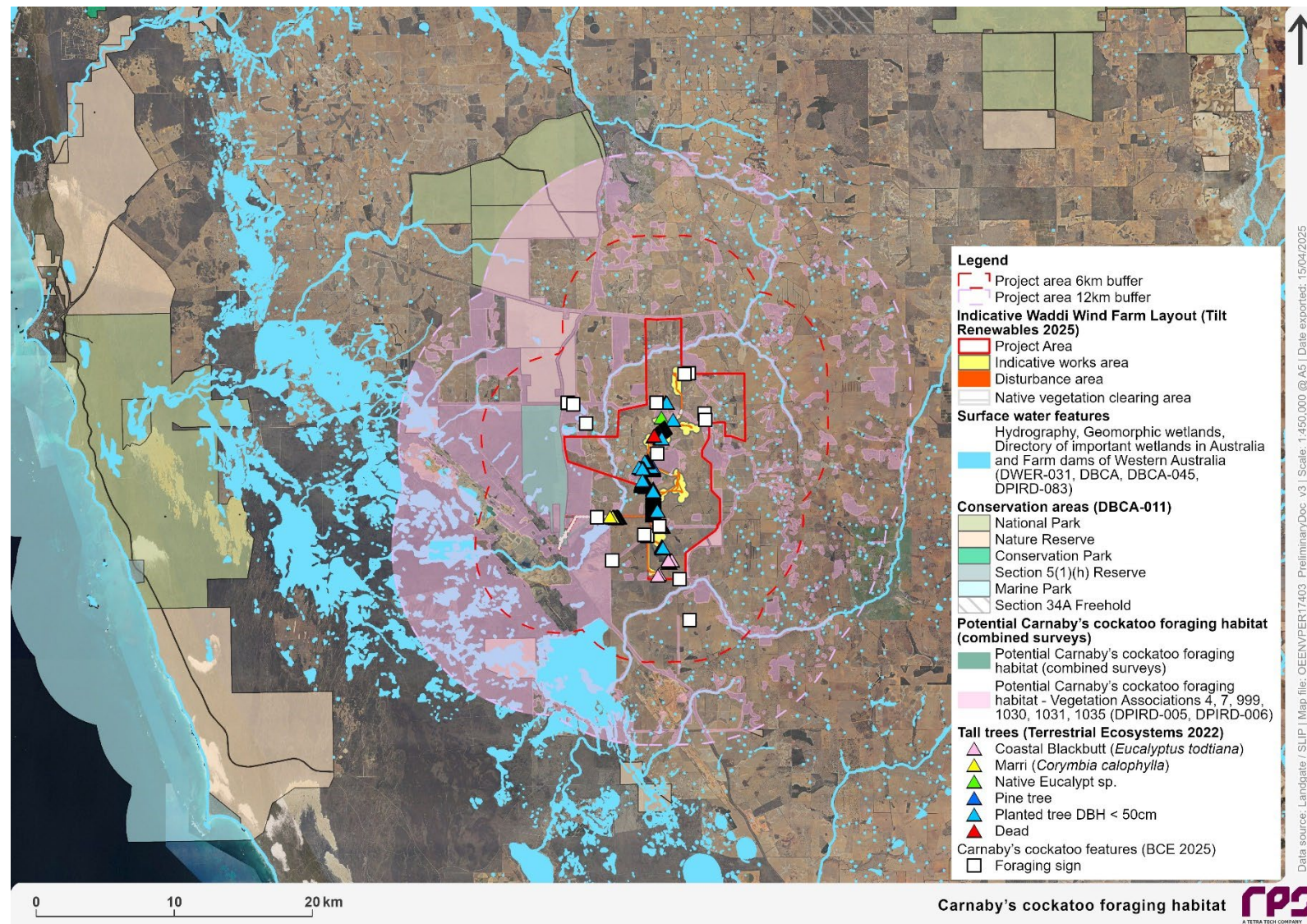


Figure 10: Carnaby's cockatoo potential foraging habitat within 12 km of the Project Area

5.3.2.5.2.1 Carnaby's cockatoo and fork-tailed swift utilisation survey (BCE 2025)

Carnaby's cockatoos mainly forage in areas up to 12 km from a nest in a known nesting tree during the breeding season, relying on the proximity of foraging resources to successfully raise chicks (DAWE 2022). The optimal daily foraging range from nests / roosts is 6 km, and the upper limit of daily foraging range from nests / roosts is 12 km (DAWE 2022, Murdoch University 2024). During the non-breeding season, Carnaby's cockatoos mainly forage in areas up to 20 km from a known night roosting habitat (DAWE 2022).

During the 2024-2025 site utilisation survey (BCE 2025), foraging signs of Carnaby's cockatoos were observed within native vegetation extents and planted vegetation within 6 km of the Project Area. The foraging signs were proximate to water sources, including farm dams, wetlands, Minyulo Brook and Mullering Brook (Figure O).

Key foraging areas within 12 km of the Project Area included larger extents of native vegetation (hakea, banksia, marri).

5.3.2.5.2.2 Black cockatoo tracking data (Murdoch University 2024)

GPS data and site observations the Carnaby breeding area, based on tag deployments in 2021 and 2022, identified most foraging occurred in a southerly direction from the main breeding area, with the closest recorded foraging occurring within 6 km of the Project Area (Murdoch University 2024). Carnaby's cockatoo have been observed foraging on a combination of proteaceous vegetation in patches within the agricultural matrix and on road verges and exotic species including canola and wild radish (Murdoch University 2024).

Key foraging areas within 12 km of the Project Area included larger extents of native vegetation (proteaceous vegetation).

5.3.2.5.2.3 Native Vegetation Extent (DPIRD-005) and Vegetation Associations (DPIRD-006)

Within 12 km of the Project Area, suitable foraging habitat for Carnaby's cockatoo is described for six vegetation associations (Shepherd et al. 2002 and Beard et al. 2013):

- Vegetation Association 4 (Medium woodland; marri & wandoo). Its key foraging features would be seeds, flowers and nectar of native proteaceous plant species in native heathland and woodland (e.g., marri nuts) (DAWE 2022).
- Vegetation Association 7 (Medium woodland; York gum (*Eucalyptus loxophleba*) and wandoo). Its key foraging features would be seeds, flowers and nectar of native proteaceous plant species in native heathland and woodland (e.g., native proteaceous plant species in woodland) (DAWE 2022).
- Vegetation Association 999 (Medium woodland; marri). Its key foraging features would be seeds, flowers and nectar of native proteaceous plant species in native heathland and woodland (e.g., marri nuts) (DAWE 2022).
- Vegetation Association 1030 (Low woodland; *Banksia attenuata* and *Banksia menziesii*). Its key foraging features would be seeds, flowers and nectar of native proteaceous plant species in native heathland and woodland (e.g., *Banksia attenuata* and *Banksia menziesii*) (DAWE 2022).
- Vegetation Association 1031 (Mosaic: Shrublands; hakea scrub-heath / Shrublands; dryandra heath). Its key foraging features would be seeds, flowers and nectar of native proteaceous plant species in native heathland and woodland (e.g., native proteaceous plant species in heath) (DAWE 2022).
- Vegetation Association 1035 (Mosaic: Medium open woodland; marri / Shrublands; dryandra heath). Its key foraging features would be seeds, flowers and nectar of native proteaceous plant species in native heathland and woodland (e.g., native proteaceous plant species in heath) (DAWE 2022).

There is approximately 39,216.09 ha of government mapped Native Vegetation Extent (DPIRD-005) intersected by Vegetation Associations 4, 7, 999, 1030, 1031 and 1035 (DPIRD-006) within 12 km of the Project Area. The vegetation association mapping provides a broad indication of potential foraging habitat for Carnaby's cockatoo as it has not been specifically surveyed for foraging values, and it does not account for habitat quality or specific preferences (e.g., proximity to water sources and roost areas).

There is over 18,000 ha of potential Carnaby's cockatoo foraging habitat within conservation estates identified within 12 km of the Project Area, including Badgingarra National Park (13,108 ha), Badgingarra Conservation Park (Lot 4134 on Deposited Plan 240347; Crown reserve 41986) (2,369 ha), Lot 3901 on

Deposited Plan 209568 (Crown Reserve 27216) (1,074 ha), Unnamed Nature Reserve (1,012 ha), Wonderrah Nature Reserve (439 ha) and Minyulo Nature Reserve (86 ha). Additionally, there are substantial areas of Carnaby's cockatoo habitat outside of the conservation estates and Crown reserves that are also utilised for foraging (Figure O).

This potential foraging habitat within 12 km of the Project Area is likely to be utilised by Carnaby's cockatoo where it is found in large consolidated extents (e.g., conservation estates).

5.3.2.5.3 Regional context

Within the Wheatbelt region, all areas of breeding habitat are critical to Carnaby's cockatoo, as are the associated foraging areas that support breeding (DAWE 2022). Vegetation in this region is fragmented and represented poorly in reserves. Carnaby's cockatoo rely on foraging resources to support breeding activities and to rebuild condition in the post-breeding period. Carnaby's cockatoo also rely on foraging resources in proximity to night roosting habitat and close access to water sources.

The 12 km radius of the Project Area extends over three IBRA subregions, the Lesueur Sandplain subregion and Dandaragan Plateau subregion of the Geraldton Sandplains IBRA bioregion and the Perth subregion of the Swan Coastal Plain IBRA bioregion. Within the three IBRA subregions, potential foraging habitat for Carnaby's cockatoo is described for six vegetation associations (Shepherd et al. 2002 and Beard et al. 2013).

- Vegetation Association 4 (Medium woodland; marri & wandoo). Its key foraging features would be seeds, flowers and nectar of native proteaceous plant species in native heathland and woodland (e.g., marri nuts) (DAWE 2022).
- Vegetation Association 7 (Medium woodland; York gum (*Eucalyptus loxophleba*) and wandoo). Its key foraging features would be seeds, flowers and nectar of native proteaceous plant species in native heathland and woodland (e.g., native proteaceous plant species in woodland) (DAWE 2022).
- Vegetation Association 999 (Medium woodland; marri). Its key foraging features would be seeds, flowers and nectar of native proteaceous plant species in native heathland and woodland (e.g., marri nuts) (DAWE 2022).
- Vegetation Association 1030 (Low woodland; *Banksia attenuata* and *Banksia menziesii*). Its key foraging features would be seeds, flowers and nectar of native proteaceous plant species in native heathland and woodland (e.g., *Banksia attenuata* and *Banksia menziesii*) (DAWE 2022).
- Vegetation Association 1031 (Mosaic: Shrublands; hakea scrub-heath / Shrublands; dryandra heath). Its key foraging features would be seeds, flowers and nectar of native proteaceous plant species in native heathland and woodland (e.g., native proteaceous plant species in heath) (DAWE 2022).
- Vegetation Association 1035 (Mosaic: Medium open woodland; marri / Shrublands; dryandra heath). Its key foraging features would be seeds, flowers and nectar of native proteaceous plant species in native heathland and woodland (e.g., native proteaceous plant species in heath) (DAWE 2022).

The vegetation association mapping provides a broad indication of potential foraging habitat for Carnaby's cockatoo as it has not been specifically surveyed for foraging values, and it does not account for habitat quality or specific preferences (e.g., proximity to water sources and roost areas). The vegetation statistics provides an indication of the extent and conservation protection of potential Carnaby's cockatoo foraging habitat within the IBRA subregions. It likely underrepresents the amount of potential Carnaby's cockatoo foraging habitat available, as other vegetation associations would provide suitable foraging habitat for the species.

Within the three IBRA subregions, there is approximately:

- 90,052.48 ha of government 2018 statewide vegetation statistics for Vegetation Associations 4, 7, 999, 1030, 1031 and 1035 in the Lesueur Sandplain subregion (Government of Western Australia 2019)
- 22,273.65 ha of government 2018 statewide vegetation statistics for Vegetation Associations 4, 7, 999, 1030, 1031 and 1035 in the Dandaragan Plateau subregion (Government of Western Australia 2019)
- 82,096.20 ha of government 2018 statewide vegetation statistics for Vegetation Associations 4, 999, 1030, 1031 and 1035 for Perth subregion (Government of Western Australia 2019)

There is over 50,000 ha of potential Carnaby's cockatoo foraging habitat within conservation estates in the three IBRA subregions for Vegetation Associations 4, 7, 999, 1030, 1031 and 1035. Potential Carnaby's cockatoo roosting habitat within conservation areas represents critical habitat for the species (BCE 2025).

The potential foraging habitat within the regional context is likely to be utilised by Carnaby's cockatoo where it is found in large consolidated extents (e.g., conservation estates).

The potential foraging habitat present in the Project Area (Section 5.3.2.5) is considered to be less important to Carnaby's cockatoos than the larger extents of potential foraging habitat available at a regional context.

5.3.2.5.4 National context

Carnaby's cockatoo are endemic to the south-west of Western Australia and are not found elsewhere in the world. Within Western Australia, potential foraging habitat is described for six vegetation associations (Shepherd et al. 2002 and Beard et al. 2013); Vegetation Associations 4, 7, 999, 1030, 1031 and 1035. The vegetation association mapping provides a broad indication of potential foraging habitat for Carnaby's cockatoo as it has not been specifically surveyed for foraging values, and it does not account for habitat quality or specific preferences (e.g., proximity to water sources and roost areas). The vegetation statistics provides an indication of the extent and conservation protection of potential Carnaby's cockatoo foraging habitat within the IBRA subregions. It likely underrepresents the amount of potential Carnaby's cockatoo foraging habitat available, as other vegetation associations would provide suitable foraging habitat for the species.

Within Western Australia, there is approximately 498,122.98 ha of government 2018 statewide vegetation statistics for Vegetation Associations 4, 7, 999, 1030, 1031 and 1035 (Government of Western Australia 2019). There is over 96,000 ha of potential Carnaby's cockatoo foraging habitat within conservation estates in Western Australia for Vegetation Associations 4, 7, 999, 1030, 1031 and 1035. Potential Carnaby's cockatoo foraging habitat within conservation areas represents critical habitat for the species (BCE 2025).

The potential foraging habitat within the national context is likely to be utilised by Carnaby's cockatoo where it is found in large consolidated extents (e.g., conservation estates).

The potential foraging habitat present in the Project Area (Section 5.3.2.5) is considered to be less important to Carnaby's cockatoos than the larger extents of potential foraging habitat available at a national context.

5.3.2.6 Site utilisation assessment

During the 2024-2025 site utilisation survey (BCE 2025; Appendix C), Carnaby's cockatoo activities observed included foraging, roosting, transiting and nesting, with one breeding pair successfully raising a chick out of the nest. The site utilisation survey was undertaken on 26-28 August, 7-9 October, 21-22 October, 6, 16-17 and 20 December 2024 and 6-7 and 10 January 2025, and sampled from pre-dawn to dusk resulting in an estimated total of over 250 hours of Vantage Point and Focal Follow sampling and 59 days of active acoustic recording. Carnaby's cockatoo flights (148 in total) amounted to an estimated total of 15 hours and 30 minutes of observations, and Carnaby's cockatoos were recorded on the acoustic recording units for 14 days.. Flight behaviours recorded were considered representative of Carnaby's cockatoo during the late winter, spring and early summer (i.e. the breeding season).

The following subsections provide a summary of the findings of the site utilisation survey (BCE 2025; Appendix C).

5.3.2.6.1 Roosting and resting activities

Six roost areas were identified by the presence of Carnaby's cockatoos active at dusk and in the same location during the following sunrise and separated by more than 500 m (Figure N) (BCE 2025). The roosts were considered as areas rather than singular trees. One roost area (over 300 ha in size) is located in the Project Area's north-eastern extent (Figure N). Roosts within and adjacent to the Project Area's eastern boundary were confirmed active during each campaign, and separate flocks of Carnaby's cockatoo were observed simultaneously using the three roosts on one evening. Flocks were observed splitting and regrouping several times and moving often several hundred m deep into twilight. Carnaby's cockatoo flocks congregating to roosting areas were highly dynamic, and trees used for roosting would change between nights. It remains unclear whether individual birds show fidelity to specific roosts or whether they move readily between roosts over different nights or during each season.

On several occasions, Carnaby's cockatoo were observed feeding and roosting in pine trees in the south and north of the Project Area and on the perimeter of paddocks (Plate 2) (BCE 2025). Flocks were seen using perches in coastal blackbutt (*Eucalyptus tottiana*), Banksia, and exotic eucalypts while foraging into the paddocks.

Carnaby's cockatoo were recorded perching in flocks of 1 – 30 birds at heights of ground level to 10 m from pre-dawn to evening (58 records) and were recorded roosting in flocks of 1 – 50 birds at heights of 1 – 9 m from morning to evening (17 records). Perching occurred when Carnaby's cockatoos used the ground, live and dead trees and fences as temporary resting places, whereas roosting occurred when Carnaby's cockatoos used suitable trees for longer periods, particularly when sleeping overnight in a communal roost area.

5.3.2.6.2 Breeding activities

No breeding activities were observed within the Project Area; however, two potential nesting trees were located within the Project Area's north-eastern extent (Figure N). The potential nesting trees recorded were wandoo and / or marri trees with chewed hollows consistent with nesting Carnaby's cockatoos in woodland north of Waddi Road. Adjacent to the Project Area's eastern boundary, one potential nesting tree and one confirmed nesting tree were located immediately adjacent to the Project Area's eastern boundary along Minyulo Brook. The nest with a parent inside the tree hollow was observed on 7 October 2024, with the parents feeding a young bird at the same location later in October.

5.3.2.6.3 Foraging activities

Carnaby's cockatoos were observed foraging and feeding across the Project Area, with characteristic chew marks on Hakea, Banksia, Marri and Pines recorded (Figure O). Carnaby's cockatoos frequently foraged in Banksia heath and Marri woodland, however foraging was also opportunistically observed in cropped paddocks of canola and lupin, and on wild radish as weed species. Often Carnaby's cockatoos were seen foraging on the edges of paddocks (Plate 2; 16 birds) near freshwater sources (a farm dam), particularly in the Project Area's north-eastern extent. Occasionally, Carnaby's cockatoos were seen foraging far within paddocks alongside Western Corellas (*Cacatua pastinator*) and feeding and roosting in pine trees in the south and north of the Project Area. Two Carnaby's cockatoos were also observed foraging on vegetation next to established transmission lines west of Brand Highway, during the targeted orchid searches in October 2024 (Plate 3).

Carnaby's cockatoos spent most of the time roosting and foraging, either on the ground or on vegetation (BCE 2025). This was true for individual birds and large flocks. When foraging and roosting in native vegetation or paddocks, groups of Carnaby's cockatoo would slowly move through the vegetation by leap frogging over birds that were perched on vegetation or on the ground.

Carnaby's cockatoo were recorded foraging and feeding in flocks of 1 – 30 birds at heights of ground level to 15 m from morning to evening (58 records).



Plate 3: Two Carnaby's cockatoos foraging on vegetation next to established transmission lines

5.3.2.6.4 Transiting activities

Carnaby's cockatoo have previously been heard flying over Banksia woodland near the Cataby substation on 6 October 2016 (Ecologia Environment 2016). During the October – November 2008 survey, Carnaby's cockatoo were observed flying over forest / woodland / heath in slow flocks and were primarily found in low-land areas with movements following valleys with woodland vegetation (RPS 2010).

Carnaby's cockatoo flights were often meandering however direct flights was observed occasionally in birds transiting larger distances, which defined the majority of flights above 30 m (BCE 2025). Throughout the day, flocks were seen not to be fixed, but instead individuals, pairs and smaller groups joined and left frequently. On several occasions, the smaller groups flew in the opposite direction from where they came from and for several kilometres. During these observations, Carnaby's were not observed flying higher than 35 m above ground level and this was only seen at the roost.

Behavioural observations of foraging Carnaby's cockatoo proximate to the Project Area found that primarily pairs, family groups and flocks move sporadically through the landscape and frequently settle to feed and roost. Longer flights were observed where flocks were intent on covering longer distances, and these longer movements were most often associated with movements soon after dawn and just before dusk.

Within the Project Area, Carnaby's cockatoo did not appear to routinely transit from a specific roost to a specific foraging ground to define a flight pathway (BCE 2025). Furthermore, it was not feasible to ascertain with the observations obtained whether any of the birds were transiting between breeding grounds and non-breeding grounds as is documented for this species.

5.3.2.7 Flight characteristics and behaviours assessment

5.3.2.7.1 Project Area context

The flight characteristics and behaviours of Carnaby's cockatoo within and proximate to the Project Area were observed during the 2024-2025 site utilisation survey (BCE 2025; Appendix C). Flock sizes of 20 to 50 birds were seen regularly in winter and early spring, with the largest flock recorded at 52 birds which was

small compared to other areas in the region. The flock sizes declined through December 2024 and into January 2025, where flocks of 12 birds or fewer were recorded and one flock of 22 birds. Flocking behaviour was highly dynamic with birds joining and leaving small to large flocks throughout the day.

Carnaby's cockatoos spent most of the time roosting and foraging, either on the ground or on vegetation (BCE 2025). This was true for individual birds and large flocks. When foraging and roosting in native vegetation or paddocks, groups of Carnaby's cockatoo would slowly move through the vegetation by leap frogging over birds that were perched on vegetation or on the ground. Carnaby's cockatoo flights were often meandering however direct flights was observed occasionally in birds transiting larger distances, which defined most flights above 30 m (BCE 2025). A high number of Carnaby's cockatoo sightings were located in the lower landscape along the Project Area's eastern boundary, with occasional forays of smaller groups across higher ground in the south and centre (BCE 2025).

Three instances of vortexing Carnaby's cockatoos was observed by BCE (2025), which is a flight behaviour exhibited often in response to disturbance. On 7 October 2024, a mixed flock of Carnaby's cockatoos and western corellas feeding in a paddock took flight due to a close overhead pass of a crop-dusting aircraft (Plate 4). The Carnaby's cockatoos and western corellas reached heights of approximately 12 m and 18 m respectively and settled back to the paddock to feed in approximately 30 seconds. On 22 October 2024, a group of 25 Carnaby's cockatoos roosting on pine trees near VP05 were disturbed by a passing group of western corellas. The group flew up in a circular manner to a maximum height of 25 m in under a minute. On 17 December 2024, a group of 12 Carnaby's cockatoos were observed spiralling upwards from under a wedge-tailed eagle. The group rose to approximately 30 m briefly before descending to a straight flight of approximately 10 m.

Flight heights of Carnaby's cockatoos were recorded in 5 m to 10 m intervals from 0 – 50 m, as shown in Figure 11. The Proposed Action's proposed dimensions of the wind turbines RSA involve the turbines positioned on higher ground and the turbines having an anticipated ground clearance of 44 m (Table 4). To compare the flight heights to the proposed RSA ground clearance of 44 m, Carnaby's cockatoos were observed flying below 44 m for 99.60% of the recorded bird time from 148 separate flights. On one occasion Carnaby's cockatoos were observed flying as high as 25 m over higher ground, near VP04, and there was a cluster of flights near VP01 which were at a maximum of 10 m over higher ground. The highest Carnaby's cockatoo flights were recorded at 50 m on four separate occasions, which involved single birds over lower ground and were outside of the turbine array.

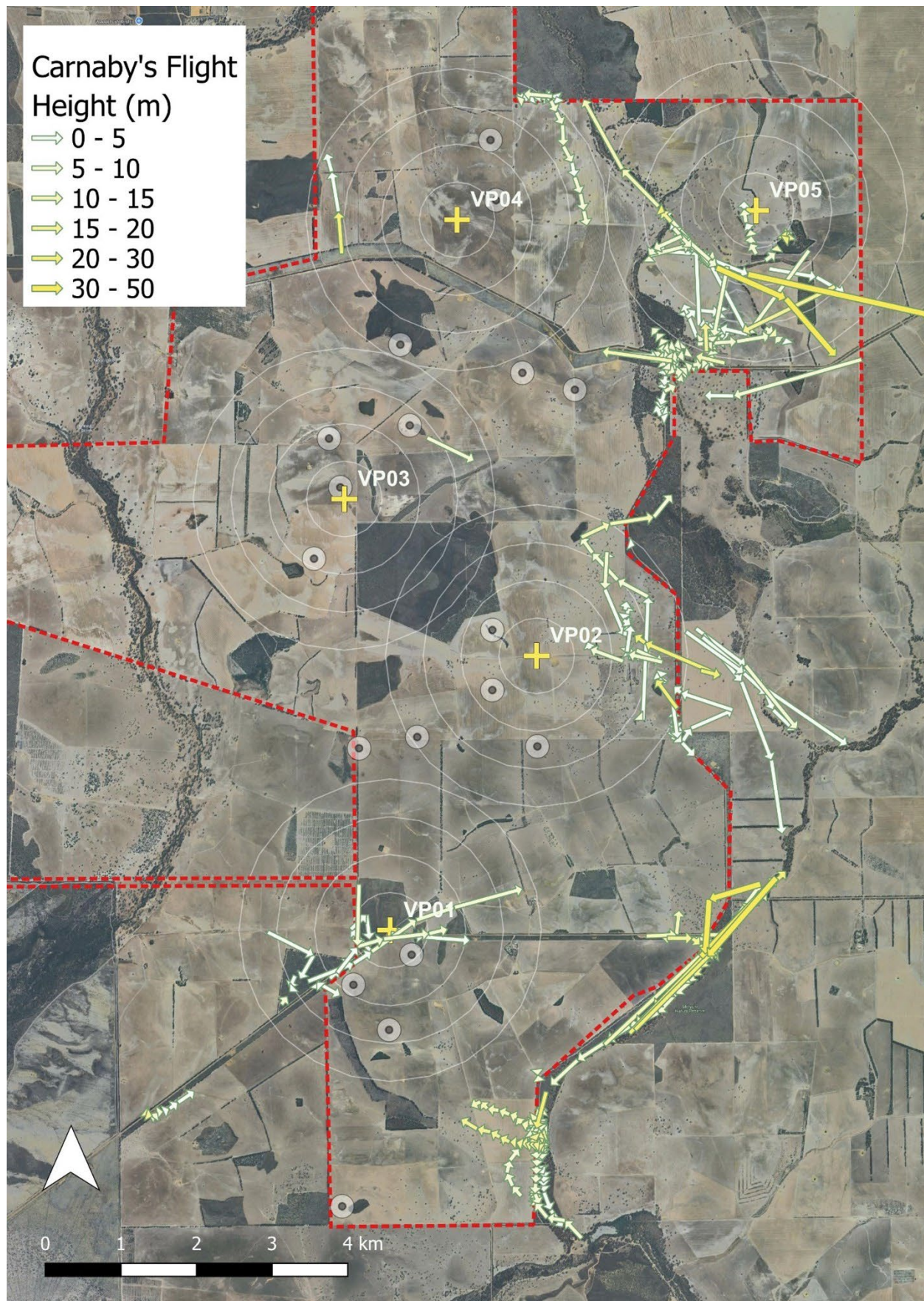
The Proposed Action's proposed transmission line structures will consist of up to approximately 30 steel poles between 11 m and 40 m in height, with an average height of approximately 30 m, and a maximum sag of 7.5 m ground clearance in the mid-span between the steel poles. Therefore, the heights of the transmission lines will range from 7.5 m to 40 m above ground level. Flight heights of Carnaby's cockatoo flying between 6 m – 40 m were 40.9% of the recorded bird time (35.2% at 6-10 m, 3.7% at 11-15 m, 1.4% at 16-20 m, 0.3% at 21-25 m, 0.2% at 26-30 m and 0.1% at 36-40 m; BCE 2025). None of the recorded flight lines of Carnaby's cockatoo overflew the proposed transmission line (Figure 11), however Carnaby's cockatoos have been observed flying over paddocks elsewhere in the Project Area and a foraging sign was been recorded proximate to the proposed transmission line (Figure O), therefore Carnaby's cockatoo may overfly the proposed transmission line.

The 148 separate flights were defined by 625 separate point records recorded for each flight during Vantage Point and Focal Follow sampling (BCE 2025). While this strongly indicates distinct concentrations of Carnaby's cockatoo movements, it must also be acknowledged that they are not isolated and, by necessity, Carnaby's cockatoos would also have moved between certain of these areas, but this was not captured in the sampling. Many observations were of Carnaby's cockatoos moving along and over native vegetation, but there were also records of Carnaby's cockatoos flying across paddocks.



(Source: BCE 2025)

Plate 4: Vortexing mixed group of 20 Carnaby's cockatoo and 12 western corellas, likely flushed by a low-flying aircraft



(Source: BCE 2025)

Figure 11: Flight lines for Carnaby's cockatoo groups showing flight heights and general distribution

5.3.2.7.2 Local 12km context (outside the Project Area)

Murdoch University researchers identified tracked flock movements in the vicinity of the Project Area from satellite tags attached to 14 individual Carnaby's cockatoos from five separate tag deployments (i.e. releases of rehabilitated cockatoos with tags attached) (Murdoch University 2024; Appendix F). Two tag deployments, in 2017 and 2022, took place at the Coomallo Creek breeding area, two further deployments in 2021 took place at the Cataby breeding area, approximately 8 km south of the Project Area on the Cataby Brook watercourse. Another deployment took place in 2022 at Regans Ford, approximately 40 km to the south of the Project Area. Each tagged bird joined a local flock of Carnaby's cockatoo and acted as a marker for the movements of and activity of the flock it joined. Therefore, Murdoch University's data set represents the movement and activity of up to 14 individual flocks across the Cataby, Cooljarloo and Badgingarra landscape in the immediate vicinity of the Project Area. The Murdoch University flock movement data sets represent brief 'snapshots' in time (i.e. data sets describe flock activity only during the active tracking period). There were likely other flocks in the area which did not contain tracked birds and for which movement data would not have been captured.

Flock movement tracks for Carnaby's cockatoos captured by Murdoch University's data within an approximate mean daily foraging distance (6 km) and an approximate maximum daily foraging distance (12 km) of the Project Area are presented in Figure 12. Flock movement tracks were obtained from satellite tags during the period that tags remained operational on 'marker birds' within each flock (typically a few weeks). Each coloured dot is an individual telemetry tagged bird (Figure 12).

Carnaby's cockatoos tagged and released into wild flocks at Regans Ford prior to the breeding season moved northwards (with their flocks) through the Cataby area shortly after their April release, and arrived in the Cooljarloo area in early May, where they remained roosting and foraging. As well, the area around Cooljarloo was used for foraging by four out of five adult breeding birds that were tagged at the Cataby breeding area. All four birds moved to the Cooljarloo area, with the flock, in either January or February and remained there for up to several months, provisioning any dependent young. A flock follow in May revealed a flock of around 100 birds utilising a roost to the west of the Cooljarloo Mine (Murdoch University 2024).

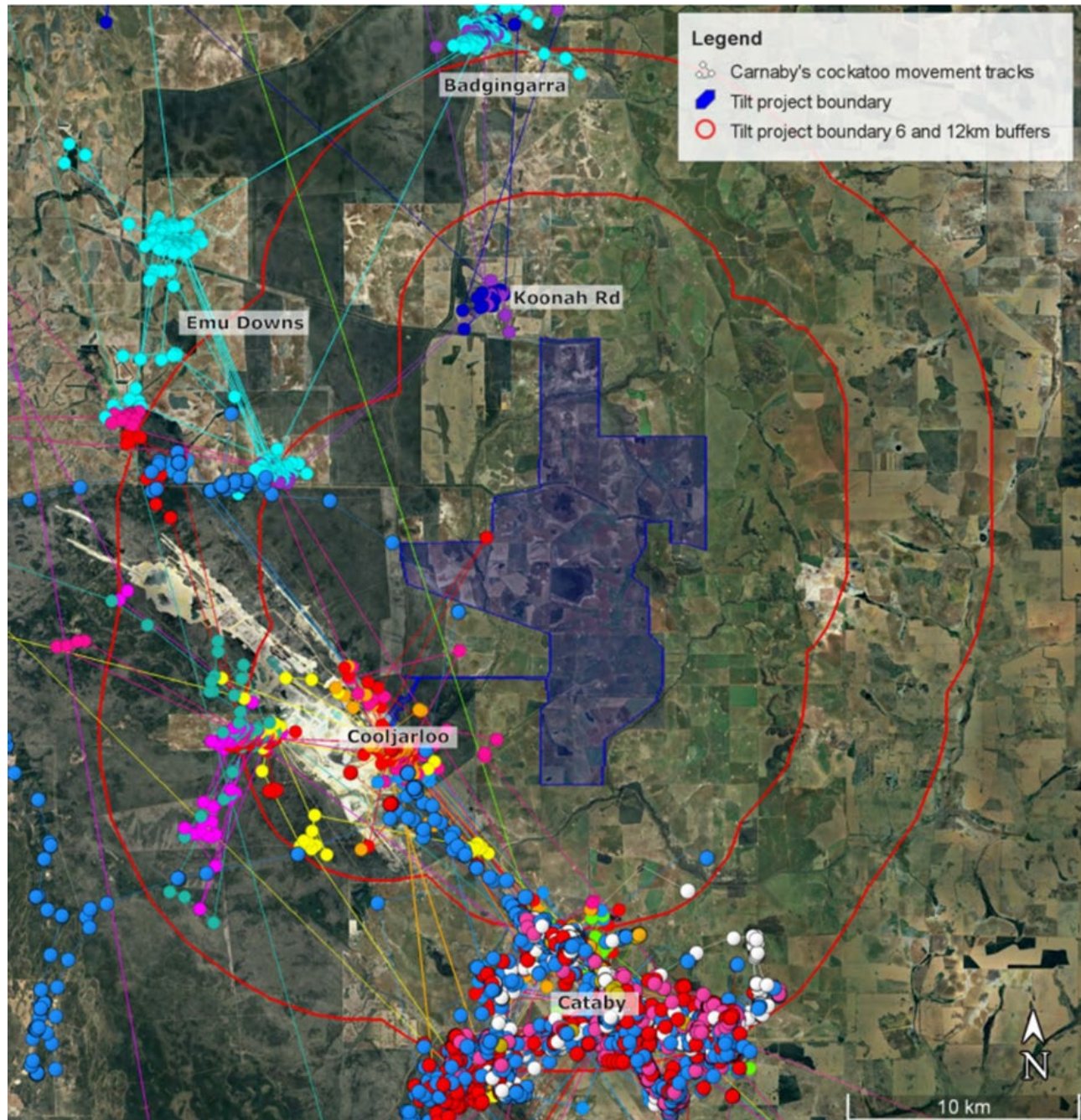
Carnaby's cockatoos roosting in the Cooljarloo area foraged on proteaceous shrubland (Murdoch University 2024). Murdoch University (2024) data for the east side of the Cooljarloo Mine includes roost locations within 800 m of the Project Area and over 80 roost nights spent in total by individual tagged birds, and their associated flocks. Vegetation within the Project Area in this location includes high quality Kwongan heath; which is preferred foraging habitat for Carnaby's cockatoos (Murdoch University 2024). The availability of this high-quality Kwongan heath foraging habitat inside the Project Area, and its proximity to the aforementioned highly utilised Carnaby's cockatoo roosts, means that this foraging habitat within the Project Area is very likely used by the Carnaby's cockatoos that are roosting at those roosts (Murdoch University 2024). This foraging habitat forms a broader contiguous link outside the Project Area, into the Badgingarra Conservation Park (Lot 4134 on Deposited Plan 240347; Crown reserve 41986) and Badgingarra National Park.

Further north, at least five tagged birds and their flocks utilised roosts in the Emu Downs area between the months of December to April. This included birds from the Cataby and Coomallo Creek breeding areas, which moved to the Emu Downs area in the weeks after breeding. Many of the roosts in the Emu Downs area are pine, with field observations indicating birds also made extensive use of pine for foraging, as well as foraging on remnant proteaceous vegetation, including along road verges and in remnant patches of native vegetation within the operating Emu Downs Wind Farm south of Bibby Road.

The Koonah Road area includes satellite data collected from two birds and their respective flocks, both tagged at the Coomallo Creek breeding area (in 2017 and 2020). The roosts identified in the Koonah Road area comprise pine trees on private property and are located approximately 3 km from the Project Area boundary; indicating that any food resources inside the Project Area at this point are well within the optimal daily foraging distance of 6 km from those two roosts.

The generalised Carnaby's cockatoo flock movements identified by Murdoch University (2024) in accord with the observations of Carnaby's cockatoo movement patterns identified by RPS (2010a) (i.e. movement of Carnaby's cockatoo occur along lowland woodland corridors within valleys) and BCE (2025) (i.e., majority of sightings located in the lower landscape along the eastern boundary). The areas to the west contain large, consolidated extents of banksia woodland and proteaceous heath communities which meet foraging requirements of Carnaby's cockatoo. The Murdoch University (2024) data indicate a strong habitat preference for the consolidated vegetated extents containing foraging, roosting and breeding habitat that occur proximate to Brand Highway, when compared to the open agricultural paddocks proximate to the turbine locations of the Proposed Action, which also include small, isolated patches of habitat.

There is significant transmission line infrastructure in the Cooljarloo and Cataby areas required to support Tronox and Iluka's sand mining operations, Pinjar Power Station and the Yandin Wind Farm. The nearest transmission lines overlap the Project Area's western extent near the Cataby substation. Murdoch University (2024) recorded Carnaby's cockatoo flock movements and roosting locations for the east side of the Cooljarloo Mine over 80 roost nights spent in total by individual tagged birds, and their associated flocks, as shown in Figure 12. The presence of transmission lines in this area does not appear to have restricted Carnaby's cockatoos' utilisation of the roosting and foraging habitat.



(Source: Murdoch University 2024)

Figure 12: Carnaby's cockatoo flock movement tracks for which Murdoch University has data

5.3.2.8 Maintaining habitat connectivity and supporting Carnaby's cockatoo movements across landscape

The Project Area and its surroundings are characterised by a highly fragmented agricultural landscape. There is potential roosting, breeding and foraging habitat available in the Project Area, as outlined in Sections 5.3.2.2 to 5.3.2.5. Carnaby's cockatoos have been observed actively using roost areas within and adjacent to the Project Area along its eastern boundary, where breeding activity and evidence has also been recorded at three potential nesting trees and one confirmed nesting tree (Figure N), and Carnaby's cockatoo have been observed foraging in the Project Area, particularly in larger extents of native vegetation (hakea, banksia, marri) (Figure O) (BCE 2025). Within the Project Area, Carnaby's cockatoo did not appear to routinely transit from a specific roost to a specific foraging ground to define a flight pathway (BCE 2025). Carnaby's cockatoo spent the majority of their time roosting and foraging, either on the ground or in vegetation. This included individual birds to the largest flocks. When foraging and roosting in paddocks or native vegetation, groups would slowly move through the vegetation by individual birds taking turns to leapfrog those birds that were perched on vegetation or on the ground. Flight was often meandering, but direct flight was observed occasionally in birds transiting larger distances and this defined the majority of flights above 30 m.

The Project Area provides potential foraging and roosting habitat for Carnaby's cockatoos using the roosting sites and the Badgingarra and Cataby breeding areas within a 12 km radius. The Project Area may also function as a connectivity corridor for birds from the other breeding areas, as well as breeding populations further afield in the Wheatbelt when those flocks move to the coastal banksia and other key foraging areas across the Swan Coastal Plain in the weeks after breeding, with their dependent fledglings (Murdoch University 2024).

The minimal clearing requirements for the Proposed Action will not materially increase the fragmentation of the existing vegetation patches within the Project Area. This is because native vegetation clearing has been proposed adjacent to existing cleared areas (e.g. sand tracks) where practicable to avoid fragmenting native vegetation patches into smaller isolated patches, and that Carnaby's cockatoos are highly mobile and can use discrete habitat patches as 'stepping-stones' whilst traversing through the Cooljarloo landscape. It is not considered that the minor reductions in extent of foraging, potential breeding and potential roosting habitat would alter the existing local connectivity values associated with the Project Area or broader regional flock movements.

The proposed transmission line infrastructure is unlikely to restrict Carnaby's cockatoo movements across the landscape considering there is already significant transmission line infrastructure in the Cooljarloo and Cataby areas, and movement patterns of Carnaby's cockatoo in the Cooljarloo and Cataby areas appear to be unaltered from the installation of transmission line infrastructure required for the sand mining operations and energy projects (RPS 2010a; Murdoch University 2024).

5.4 Habitat assessment for ecological community and flora species

5.4.1 Banksia woodlands of the Swan Coastal Plain Threatened Ecological Community

The Banksia woodlands of the Swan Coastal Plain TEC is listed as Endangered under the EPBC Act. This TEC typically has a prominent tree layer of Banksia sometimes with scattered eucalypts and other tree species within or above the Banksia canopy. The understorey is species rich with many wildflowers, including sclerophyllous shrubs, sedges and herbs. Banksia Woodlands vary in their structure (height, cover, density) and species composition across the Swan Coastal Plain. These variations can occur over small distances, but the woodlands are united by having a generally dominant Banksia component, which includes at least one of the following species *Banksia attenuata*, *Banksia menziesii*, *Banksia prionotes* and / or *Banksia ilicifolia* (DEE 2016b).

Approximately 53,156 ha of the Banksia woodlands of the Swan Coastal Plain TEC is reported within a 25 km search radius of a central point within the Project Area by the DBCA's Threatened and Priority ecological communities database (Figure I). Banksia woodlands of the Swan Coastal Plain TEC were identified in the portion of the Project Area that intersects with the Swan Coastal Plain IBRA bioregion by the Reconnaissance flora and vegetation survey (RPS 2023) and the Waddi Wind Farm proposed action – Cataby Supplementary Flora, Vegetation and Fauna Survey (Ecologia Environment 2016). The Banksia woodlands of the Swan Coastal Plain TEC was not detected by any of the preceding flora and vegetation

surveys (Outback Ecology 2014; Outback Ecology 2010), however these surveys were undertaken prior to the listing of the TEC under the EPBC Act in 2016. It is considered that banksia woodland vegetation within the Swan Coastal Plain IBRA bioregion identified by these surveys is representative of the Banksia woodlands of the Swan Coastal Plain TEC.

Within the Project Area, 0.3 ha of Banksia woodlands of the Swan Coastal Plain TEC is proposed to be permanently lost. Of the 0.3 ha of the Banksia woodlands of the Swan Coastal Plain TEC, approximately 0.1 ha (or 33.3%) was assessed to be in Excellent condition by Ecologia Environment (2016) and 0.2 ha (or 66.7%) was assessed to range in condition from Good to Excellent by Outback Ecology (2014). Acknowledging that a range of conditions is not appropriate to qualify potential impacts to the Banksia woodlands of the Swan Coastal Plain TEC, for the purpose of this assessment the banksia woodlands vegetation is conservatively assumed to be in Excellent condition.

The permanent loss of 0.3 ha of Banksia woodlands of the Swan Coastal Plain TEC is intended to allow a slight widening of the existing access tracks to allow access and egress for construction and operational maintenance machinery. The approach in using the already cleared access tracks as the basis for planned machinery movements has minimised clearing requirements as low as possible in the more sensitive Swan Coastal Plain environments.

The 0.3 ha of Banksia woodlands of the Swan Coastal Plain TEC is comprised of discrete patches that are situated adjacent to existing sand access tracks and are further fragmented by a sealed road leading to Tronox's sand mining operations. These discrete patches are directly connected to larger contiguous extents of native vegetation that have previously been assessed by Ecologia Environment (2016) and Outback Ecology (2014) to be banksia woodland vegetation and hence representative of the Banksia woodlands of the Swan Coastal Plain TEC (Figure I).

Approximately 12.4 ha of Banksia woodlands of the Swan Coastal Plain TEC has been avoided within the broader area assessed by RPS (2023), Ecologia Environment (2016) and Outback Ecology (2014) surveys. The buffered extent of the DBCA's ecological community records identifies that there are approximately 53,156 ha of Banksia woodlands of the Swan Coastal Plain TEC patches recorded within 25 km of the Project Area (RPS 2023). The Proposed Action will clear approximately 0.3 ha (or 0.0005%) out of more than 53,156 ha of the Banksia woodlands of the Swan Coastal Plain TEC present in the Proposed Action's regional area.

The loss of the discrete patches of Banksia woodlands of the Swan Coastal Plain TEC that are situated adjacent to existing sand access tracks will not dissect the adjoining vegetation into smaller parcels or result in forming isolated vegetated areas within the landscape. The potential for indirect impacts to occur to the adjoining vegetation (e.g. through introduction and spread of *Phytophthora* dieback or weeds) will be managed through the implementation of the following general hygiene protocols:

- Clean earth-moving machinery and vehicles of soil and vegetation prior to entering the Disturbance Area
- Soil to be moved in dry conditions
- No *Phytophthora* dieback infested or weed impacted soil, mulch, fill or other material is brought into the Disturbance Area
- Movement of machines and other vehicles to be restricted to cleared access tracks and works area within the Disturbance Area.

Prior to vegetation clearing / construction commencing, a *Phytophthora* dieback survey of the Native Vegetation Clearing Area will be undertaken by a *Phytophthora* dieback specialist. The findings and recommendations of the *Phytophthora* dieback survey will inform the implementation of the proposed hygiene protocols.

Additional controls to be implemented during construction to address other potential indirect impacts (e.g. accidental clearing) are listed in Table 23.

With the implementation of appropriate hygiene and construction controls to manage potential indirect impacts, the ecological values of the adjoining Banksia woodlands of the Swan Coastal Plain TEC are not predicted to diminish. Hence the broader connected extents of Banksia woodlands of the Swan Coastal Plain TEC are predicted to retain their existing ecological values.

5.4.2 Star sun-orchid

The star sun-orchid (*Thelymitra stellata*) is listed as Endangered under the EPBC Act. It is a tuberous perennial herb which grows between 0.15–0.25 m high. Star sun-orchids grow over sand, gravel and lateritic loam soils and flower yellow and brown from late September to November (Western Australian Herbarium 1998–, Department of the Environment 2025a) (Plate 5).



(Source: Western Australian Herbarium 1998–)

Plate 5: Star sun-orchid (*Thelymitra stellata*)

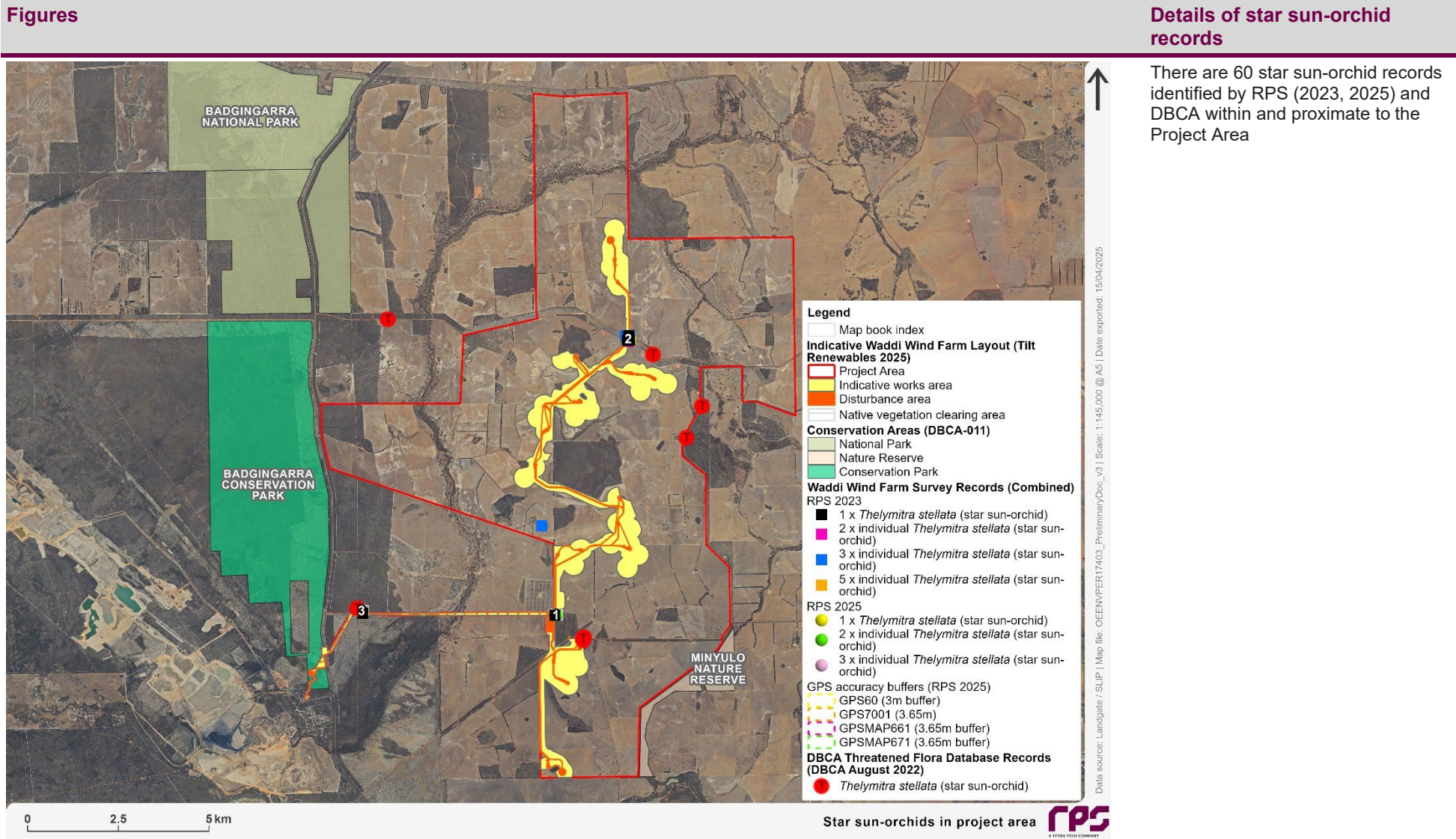
5.4.2.1 Database and field survey records

Ten records of the star sun-orchid are reported within a 25 km search radius of a central point by the DBCA's Threatened and Priority flora database. Sixteen star sun-orchid records (37 individuals) were detected within proteaceous heath vegetation lateritic / gravelly hill top areas by the Reconnaissance flora and vegetation survey (RPS 2023). Twenty-five sun-orchid records (34 individuals) were detected within proteaceous heath vegetation on gravelly hill tops by the Targeted star sun-orchid and sandplain duck orchid searches (RPS 2025). The star sun-orchid was not detected within any other vegetation community or by any of the preceding flora and vegetation surveys (Ecologia Environment 2016; Outback Ecology 2014; Outback Ecology 2010).

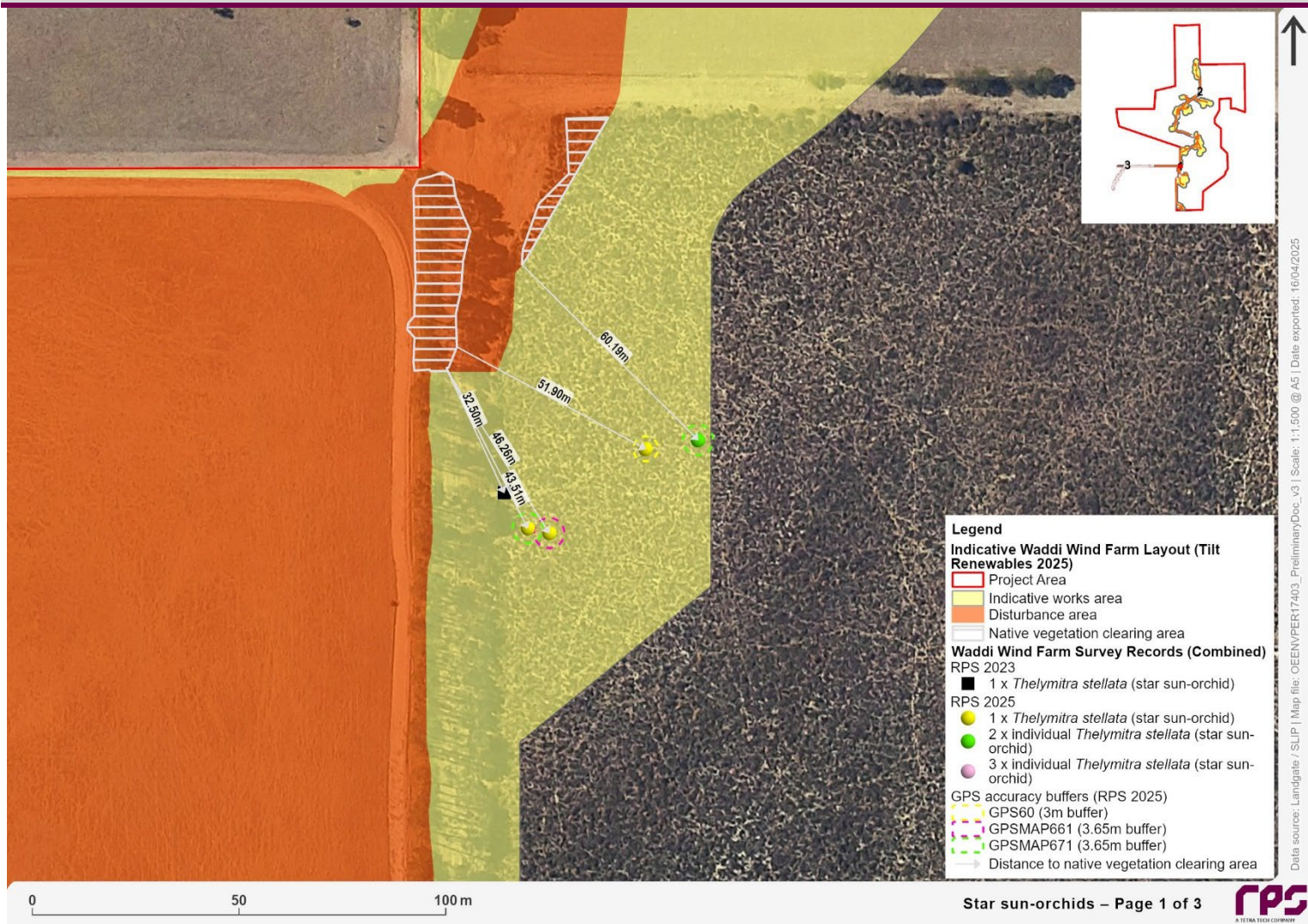
Star sun-orchid records and potential habitat for star sun-orchid within and proximate to the Project Area is illustrated in Figure B and Figure C.

The separation distances of the star sun-orchid records proximate to the Native Vegetation Clearing Area are presented in Figure 13 to Figure 16 and described in Table 16.

Table 16: Star sun-orchid records within and proximate to the Project Area



Figures

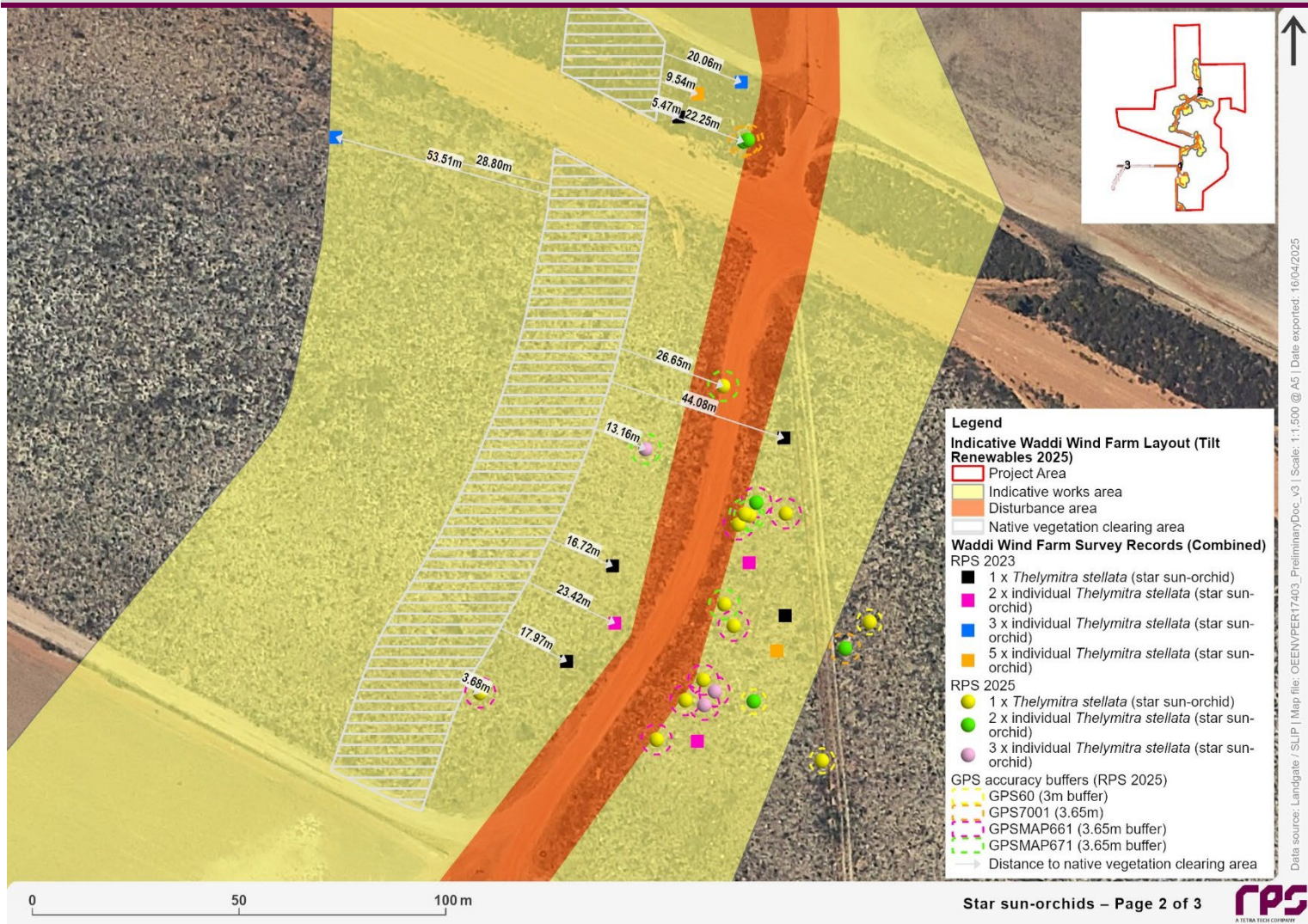


Details of star sun-orchid records

- 4 star sun-orchid records (5 individuals) identified by RPS (2025) are located approximately 43 – 60 m from the Native Vegetation Clearing Area
- 1 star sun-orchid record (1 individual) identified by RPS (2023) is located approximately 32 m from the Native Vegetation Clearing Area

Figure 14: Star sun-orchid records adjacent to access track near Mullering Road

Figures

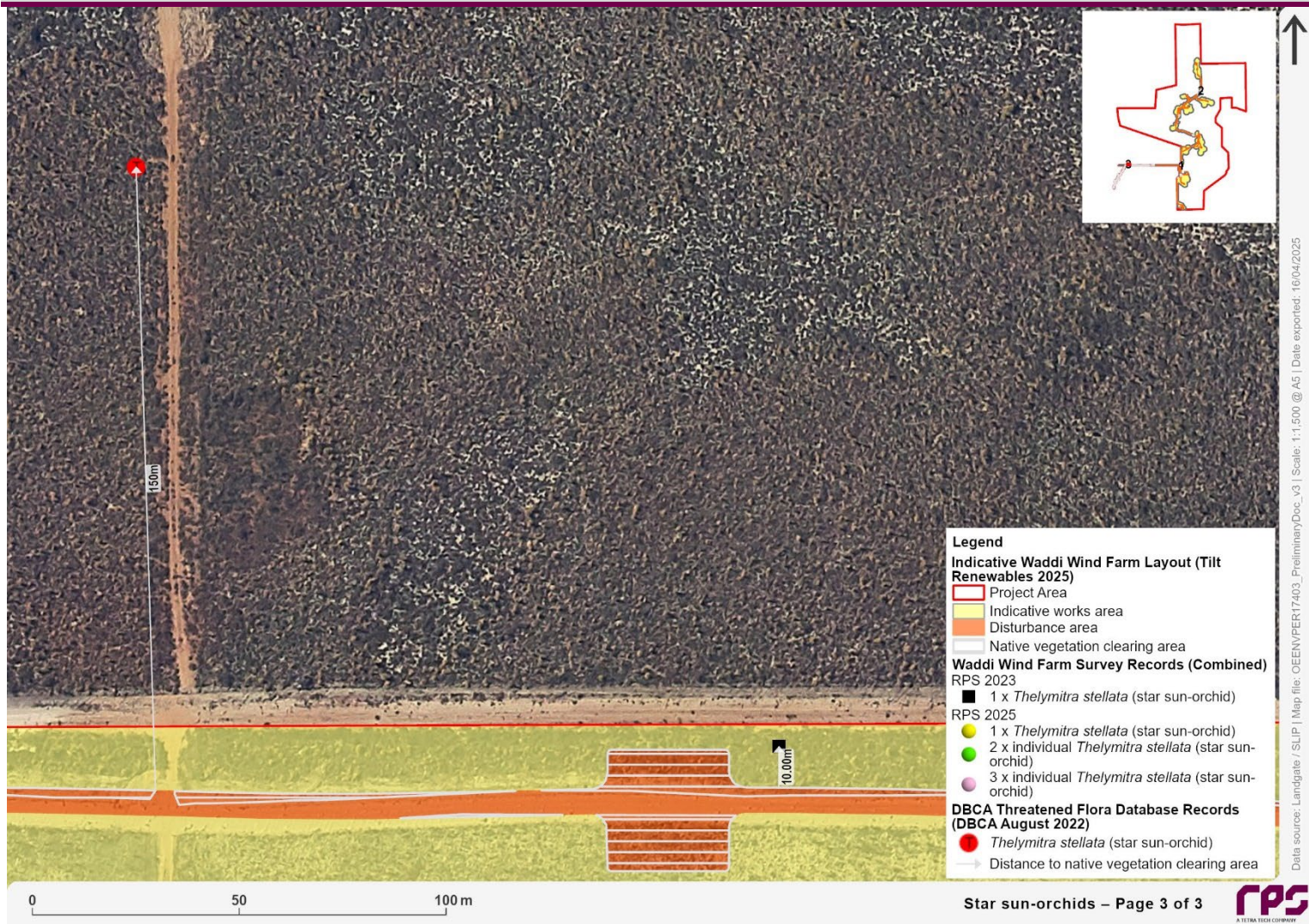


Details of star sun-orchid records

- 21 star sun-orchid records (29 individuals) identified by RPS (2025) are located approximately 3.68 – 85 m from the Native Vegetation Clearing Area
- 13 star sun-orchid records (32 individuals) identified by RPS (2023) are located approximately 5.47 – 60 m from the Native Vegetation Clearing Area
- All but one record of star sun-orchids are at least 5 m from the Native Vegetation Clearing Area. One star sun-orchid record is 3.68 m from the Native Vegetation Clearing Area

Figure 15: Star sun-orchid records within Waddi Road reserve

Figures



Details of star sun-orchid records

- 1 star sun-orchid record (1 individual) identified by RPS (2023) is located approximately 10 m from the Native Vegetation Clearing Area
- 1 star sun-orchid record (3 individuals) identified by DBCA is located approximately 150 m from the Native Vegetation Clearing Area

Figure 16: Star sun-orchid records adjacent to proposed transmission line

5.4.2.2 Weather and climate conditions

Badgingarra Research Station is the nearest Bureau of Meteorology weather station (No. 009037) to record climatic statistics, located approximately 18 km north of the Project Area (Station no. 009037) (Bureau of Meteorology 2025). The Badgingarra (BA) DPIRD weather station is situated at the same location and records climatic statistics (DPIRD 2025).

5.4.2.2.1 Reconnaissance flora and vegetation survey (RPS 2023)

The Bureau of Meteorology winter rainfall conditions for the Reconnaissance flora and vegetation survey (RPS 2023) were optimal for orchid emergence and flowering (19 mm above the long-term winter average in 2021 and 77 mm above the long-term winter average in 2022) (Table 17) (Bureau of Meteorology 2025). The above average rainfall conditions resulted in good flowering in both annual and perennial species. The timing of the targeted search for star sun-orchid was optimal for detection of this species in flower.

Table 17: Rainfall statistics of winter months prior to 2021-2022 targeted searches for star sun-orchids

Statistics	June	July	August	Total winter rainfall	Difference to long-term average
Average rainfall (mm) for years 1962 – 2025	97.3	102.7	84.7	284.7	-
Rainfall (mm) for year 2021	63.8	183.8	56.4	304	19.3
Rainfall (mm) for year 2022	97.6	95.6	169	362.2	77.5

(source: Bureau of Meteorology 2025)

Climatic variables at the time of survey (wind speed, temperature, precipitation, time of sunrise and time of day) and cloud cover can influence the probability of orchids being seen and identified by observers (Commonwealth of Australia 2013). For example, the star sun-orchid flowers remain closed overnight and during cool overcast weather. The DPIRD daily weather and climate conditions during the targeted searches (RPS 2023) are presented in Table 18.

The targeted searches undertaken in September to October 2021 and September 2022 experienced cool weather conditions, with minimal rainfall and light to gentle breeze winds. Star sun-orchids flowers typically remain closed in cool weather; however, star sun-orchids individuals are easily identifiable in the field given their unique characteristics (i.e. single leaf and stem; curled leaf structure). At least one individual was in flower (Plate 6).

Table 18: Search timings and daily weather and climate conditions during 2021-2022 targeted searches for star sun-orchids

Day	Search timings	Minimum temperature (°C)	Maximum temperature (°C)	Rainfall (mm)	Wind average speed (km/hr)	Cloud cover (%)
29/09/2021	Not recorded	11.4	24.2	0.2	9	Not recorded
30/09/2021	Not recorded	9	23.7	0.2	8	Not recorded
1/10/2021	Not recorded	12.4	17.4	9.8	13	Not recorded
2/10/2021	Not recorded	7.8	18.1	9.8	11	Not recorded
3/10/2021	Not recorded	10.3	20.2	1.4	10	Not recorded
4/10/2021	Not recorded	6.4	19.6	0	8	Not recorded
5/10/2021	Not recorded	7.5	17.7	0	8	Not recorded
6/10/2021	Not recorded	4.5	19.8	2.2	9	Not recorded

REPORT

Day	Search timings	Minimum temperature (°C)	Maximum temperature (°C)	Rainfall (mm)	Wind average speed (km/hr)	Cloud cover (%)
7/10/2021	Not recorded	4.8	22.2	0	8	Not recorded
7/09/2022	Not recorded	4.1	20.1	2.8	5	Not recorded
8/09/2022	Not recorded	8.3	21.2	0.2	5	Not recorded
9/09/2022	Not recorded	5.4	20.4	0	6	Not recorded

(source: RPS 2023, DPIRD 2025).



(source: RPS 2023)

Plate 6: Star sun-orchid identified in October 2021

5.4.2.2 Targeted star sun-orchid and sandplain duck orchid searches (RPS 2025)

The Bureau of Meteorology winter rainfall conditions for the Targeted star sun-orchid and sandplain duck orchid searches (RPS 2025) were optimal for orchid emergence and flowering (64 mm above the long-term winter average in 2024) (Table 19) (Bureau of Meteorology 2025). However, rainfall in the month prior to the survey (September 2024) was minimal at approximately 20% of the long-term September average. Although September 2024 had significantly less rainfall than the long-term September average, environmental conditions for 2024 were generally considered favourable for the emergence and detectability of terrestrial flora species.

Table 19: Rainfall statistics of winter months prior to 2024 targeted searches for star sun-orchids

Statistics	June	July	August	Total winter rainfall	Difference to long-term average
Average rainfall (mm) for years 1962 – 2025	97.3	102.7	84.7	284.7	-
Rainfall (mm) for year 2024	104.2	158.4	86.4	349	64.3

(source: Bureau of Meteorology 2025)

Climatic variables at the time of survey (wind speed, temperature, precipitation, time of sunrise and time of day) and cloud cover can influence the probability of orchids being seen and identified by observers (Commonwealth of Australia 2013). For example, the star sun-orchid flowers remain closed overnight and during cool overcast weather. The DPIRD daily weather and climate conditions during the targeted searches (RPS 2025) are presented in Table 20.

The targeted searches undertaken in October 2024 experienced cool and overcast weather conditions, with minimal rainfall and light to gentle breeze winds. Due to the cool and overcast weather conditions, the observed star sun-orchids that were in flower were generally not fully open. Despite this, star sun-orchid individuals were easily identifiable in the field for the reasons stated above (Plate 7).

Table 20: Search timings and daily weather and climate conditions during 2024 targeted searches for star sun-orchids

Day	Search timings	Minimum temperature (°C)	Maximum temperature (°C)	Rainfall (mm)	Wind average speed (km/hr)	Cloud cover (%)
21/10/2024	Midday to 4:30 pm	8.8	21.4	4.2	8	25-50%
22/10/2024	7:30 am to 5:00 pm	5.8	22.6	0.2	8	75-85%
23/10/2024	8:00 am to 5:00 pm	9.2	28.1	0	12	0-15%
24/10/2024	8:00 am to 11:00 am	11.8	33.5	0	14	0-15%

(source: RPS 2025, DPIRD 2025).



(source: RPS 2025)

Plate 7: Star sun-orchid identified in October 2024

5.4.2.3 Survey effort

Targeted searches for the star sun-orchid (RPS 2023, RPS 2025) were undertaken in accordance with the Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016) and the draft Survey Guidelines for Australia's Threatened Orchids (Commonwealth of Australia 2013). The field survey for the Reconnaissance flora and vegetation survey (RPS 2023) was undertaken between 29 September and 7 October in 2021 and between 7 September and 9 September in 2022, and the field survey for the Targeted star sun-orchid and sandplain duck orchid searches (RPS 2025) was undertaken between 21 and 24 October 2024. The targeted searches were undertaken during the known flowering time of star sun-orchids, from late September to November (Western Australian Herbarium 1998–).

The Reconnaissance flora and vegetation survey (RPS 2023) of 1,445 ha covered 78% of the Native Vegetation Clearing Area, including 90% of the proteaceous heath vegetation within the Native Vegetation Clearing Area (Appendix R). The Targeted star sun-orchid and sandplain duck orchid searches (RPS 2025) survey area was 83.46 ha in size, however the searched areas and transects were broader as they extended outside the survey area (as shown in Appendix E). Therefore, the targeted searches covered 100% of the Native Vegetation Clearing Area, including 100% of the proteaceous heath vegetation within the Native Vegetation Clearing Area.

Considerable survey effort has been expended across the multiple seasons by the flora and vegetation surveys, all of which have included a targeted search component, to identify conservation significant flora species (Table 6). The additional survey in 2024 is considered to cover the multiple seasons required in the draft Survey Guidelines for Australia's Threatened Orchids (Commonwealth of Australia 2013) and ensured that 100% of the potential habitat for star sun-orchid within the Native Vegetation Clearing Area was surveyed.

Considering that the results of the 2024 targeted searches show high correlation with results of RPS (2023), and both the RPS (2023) searches and the 2024 targeted searches had seasonal conditions conducive to orchid emergence, additional supplementary sampling in succeeding years is not considered to be required.

5.4.2.4 Local and regional genetic connectivity of known and likely star sun-orchids

The star sun-orchid has a restricted distribution within the Project Area with all 16 records (containing 37 individuals) identified by RPS (2023), and 25 records (containing 34 individuals) identified by RPS (2025), detected within proteaceous heath vegetation over lateritic / gravelly hill top areas (Figure C). This habitat type is considered to be the key assemblage for star sun-orchid in the Project Area.

Proteaceous heath vegetation is broadly distributed throughout the Project Area with 45.7 ha recorded in surveyed extents within the Project Area. At a regional scale, representative vegetation is described for Vegetation Association 1031 (Mosaic: Shrublands; hakea scrub-heath / Shrublands; dryandra heath) (Shepherd et al. 2002 and Beard et al. 2013). The majority of the 10 records of star sun-orchids identified from the DBCA's Threatened and Priority flora database within a 25 km radius occurred in the Vegetation Association 1031 on laterite rock. The broad Vegetation Association 1031 has 34.5% (83,217 ha) of its pre-European extent remaining within the Geraldton Sandplains IBRA bioregion (Section 4.4.1.1) (Government of Western Australia 2019).

Figure C illustrates potential habitat for star sun-orchid within 12 km of the Project Area, which is comprised of surveyed proteaceous heath vegetation and government mapped Native Vegetation Extent (DPIRD-005) intersected by Vegetation Association 1031 (DPIRD-006). The Vegetation Association 1031 mapping is a broad indication of potential habitat as it has not been specifically surveyed for star sun-orchid, and it does not account for specific habitat preferences (e.g., in sand, gravel and lateritic loam soils). There is over 18,000 ha of potential habitat for star sun-orchid within 12 km of the Project Area; comprised of 58.49 ha of surveyed proteaceous heath vegetation (RPS 2023) and 18,264.60 ha of government mapped Native Vegetation Extent (DPIRD-005) overlaid by Vegetation Association 1031 (DPIRD-006). The Proposed Action will clear approximately 1.21 ha (or 2.1%) of the surveyed proteaceous heath vegetation within and proximate to the Project Area, which represents 0.007% out of the over 18,000 ha of potential habitat for star sun-orchid within 12 km of the Project Area.

The EPA has an objective to seek to retain at least 30% of the pre-European extents of each ecological community, consistent with recognised retention level (EPA 2016; Commonwealth of Australia 2001). The EPA uses vegetation associations as the basis for regional representation of biodiversity (EPA 2016). The remaining pre-European extent for the broad Vegetation Association 1031 has achieved the over 30% retention objective, hence biodiversity values including potential habitat for the star sun-orchid is well represented across the Geraldton Sandplains IBRA bioregion.

The genetic connectivity between known and likely occurrences of the species across the Project Area and broader region is influenced by the availability of suitable habitat and its ability to pollinate (Department of the Environment 2025a). Suitable habitat for star sun-orchids is found in the Project Area, and in the broader region, within remnant patches of native vegetation surrounded by cleared agricultural land. The known populations of star sun-orchids are situated in connected (e.g., Waddi Road reserve) and disjunct native vegetation extents (Figure C). Considering its pollination biology, the star sun-orchids are probably entomophilous (pollinated by insects) (Jeanes 2006), such as beetles attracted to the species as potential mates (Department of the Environment 2025a).

The proposed clearing of 1.21 ha of the potential star sun-orchid habitat is not anticipated to adversely affect the current genetic connectivity between known and likely occurrences of the species as:

- Potential habitat for the star sun-orchid is well represented across the Geraldton Sandplains IBRA bioregion
- Known records of star sun-orchids have been avoided
- Insect pollination of star sun-orchids would not be restricted by the Project's activities and proposed clearing.

5.4.2.5 Impact avoidance approach

Of the 58.49 ha of proteaceous heath vegetation recorded by the flora and vegetation surveys within and proximate to the Project Area, approximately 1.21 ha (or 2.1%) of the proteaceous heath vegetation or potential star sun-orchid habitat is proposed to be cleared. All known records of the star sun-orchid and 97.9% of surveyed potential star sun-orchid habitat within and proximate to the Project Area will be avoided (Figure C).

The 2024 targeted searches identified 10 star sun-orchid individuals as possibly located in the previous Native Vegetation Clearing Area (accounting for GPS accuracy levels of 3 m and 3.65 m) (RPS 2025). In response to these findings, the Proponent investigated alternative options to avoid potentially impacting up to 10 star sun-orchid individuals.

These options included:

1. Narrowing the originally proposed access track:
 - a. Options for narrowing the proposed access track to as low as 8 m were considered by the Proponent's engineers, however a suitable layout for the proposed oversize overmass (OSOM) vehicle movements that avoided direct orchid impacts could not be achieved.
2. Relocating the proposed access track and underground cabling to an alternative location along Waddi Road.
 - a. Alternative access locations along Waddi Road are highly constrained due to:
 - i. The presence of extensive vegetation either side of the road formation width comprising Carnaby's Black Cockatoo foraging, potential breeding trees and potential star-sun orchid habitat, as well as habitat for listed threatened and priority flora under the *Biodiversity Conservation Act 2016* (BC Act) (WA);
 - ii. The undulating topography and flexuous course of Waddi Road (Figure P), presenting engineering challenges for OSOM vehicle movements;
 - iii. The presence of underground services including the Dampier to Bunbury Natural Gas Pipeline, constraining the location of proposed underground cabling; and
 - iv. The presence of Moodjar trees of Aboriginal cultural heritage significance to Yued Noongar within the Waddi Road reserve.
 - b. A potential alternative location for the access track and underground cabling was identified and considered in further detail (Figure 17). However, it was ultimately determined that the location:
 - i. Would result in the need to clear significantly higher levels of vegetation comprising Carnaby's Black Cockatoo foraging habitat, potential breeding trees and potential star-sun orchid habitat⁷ (due to the OSOM turning circles required for turbine blades and large tower sections),
 - ii. Would not provide suitable safe intersection sight distances for OSOM vehicle movements ingressing and egressing Waddi Road.
 - iii. Would not be consistent with the Development Approval for the Proposed Action.
3. Realigning the access track and underground cabling to the immediate west of the existing access track, outside the recorded star sun-orchid locations.
 - a. A suitable location for the proposed access track and underground cabling was able to be identified within a surveyed area west of the existing access track.
 - b. While the proposed location would result in a slight increase to overall vegetation clearance within an area of potential Carnaby's Black Cockatoo foraging habitat, it would enable all direct impacts to star sun-orchids to be avoided having regard to the GPS accuracy of ± 3.65 m.
4. Removing the two turbines north of Waddi Road or relocating these south of Waddi Road.
 - a. Removing the two turbines north of Waddi Road would have a critical impact on the viability of the Proposed Action and fail to deliver the Proposed Action's intended benefits in terms of carbon emissions reductions and contribution towards the achievement of Western Australian and Commonwealth renewable energy targets (see Sections 1.3.3 and 3.2.1.1).
 - b. Options for relocating the two turbines south of Waddi Road are highly constrained due to the presence of dwellings and landowner exclusion zones, turbine wake effects, electromagnetic interference, Aboriginal cultural heritage sites and remnant native vegetation. Relocation of the

⁷ The precautionary principle was applied here as the presence of star sun-orchids along Waddi Road is uncertain. The full extent of this roadway has not been surveyed in line with the requirements of the Commonwealth of Australia (2013) Draft Survey Guidelines for Australia's Threatened Orchids.

turbines would also require amendments to the Proponent's network modelling, access offer and Generator Performance Standards assessment process with Western Power and the Australian Energy Markets Operator (AEMO), as well as amendments to other statutory approvals such as the Development Approval (see Section 9). This would place the ability of the Proposed Action to achieve full operations by 2030 at risk, impacting its ability to support achievement of Western Australian and Commonwealth governments' 2030 renewable energy targets.

Ultimately, the option pursued was to relocate the proposed access track and underground cabling to the immediate west of the existing. This enabled a 5 m buffer to be achieved around each of the star sun-orchid records, except for one star sun-orchid record (1 individual) to the south, where the individual was able to be avoided having regard to the GPS survey accuracy level of ± 3.65 m. The option to shift the proposed access road west was pursued to meet DCCEEW's expectation of avoidance of all individuals in the event that pre-clearance surveys detect the species in areas of planned disturbance (Appendix A and Appendix B).

To ensure that the potential for indirect impacts to star sun-orchids are appropriately controlled, additional management and monitoring actions are proposed for pre-construction / construction and operation of the Proposed Action as detailed in Table 23 and Appendix E.

5.4.3 Dwarf green kangaroo paw

The dwarf green kangaroo paw (*Anigozanthos viridis* subsp. *terraspectans*) is listed as Vulnerable under the EPBC Act. It is a rhizomatous perennial herb, which grows between 0.05–0.2 m high. Dwarf green kangaroo paw occurs over grey sand, clay loam in winter wet depressions and flower green to yellow–green around August to September (Western Australian Herbarium 1998–) (Plate 8).



(Source: Western Australian Herbarium 1998–)

Plate 8: Dwarf green kangaroo paw (*Anigozanthos viridis* subsp. *terraspectans*)

5.4.3.1 Database and field survey records

Twenty-five records of the dwarf green kangaroo paw are reported within a 25 km search radius of a central point within the Project Area by the DBCA's Threatened and Priority flora database. One dwarf green kangaroo paw record (one individual) was detected within Banksia low open woodland vegetation by the Reconnaissance flora and vegetation survey (RPS 2023). The dwarf green kangaroo paw was not detected within any other vegetation community or by any of the preceding flora and vegetation surveys (Ecologia Environment 2016; Outback Ecology 2014; Outback Ecology 2010).

Dwarf green kangaroo paw records and potential habitat for dwarf green kangaroo paw within and proximate to the Project Area are illustrated in Figure B and Figure D.

5.4.3.2 Weather and climate conditions

The Bureau of Meteorology winter rainfall conditions for the Reconnaissance flora and vegetation survey (RPS 2023) were optimal for flowering (19 mm above the long-term winter average in 2021 and 77 mm above the long-term winter average in 2022) (Table 19) (Bureau of Meteorology 2025). The above average rainfall conditions resulted in good flowering in both annual and perennial species. The timing of the targeted search for dwarf green kangaroo paw was optimal for detection of this species in flower.

5.4.3.3 Survey effort

The dwarf green kangaroo paw is a perennial herb and persists in the landscape permanently, hence there is high confidence that the occurrences of this species would have been detected by the targeted searches (if present). There are no mapped winter wet depressions within the Project Area (Figure R), nor were any wetter habitat types identified by the flora and vegetation surveys (RPS 2023; Ecologia Environment 2016; Outback Ecology 2014; Outback Ecology 2010) hence the preferred habitat conditions for this species are not present within the Project Area.

A targeted search for the dwarf green kangaroo paw (RPS 2023) was undertaken in accordance with the Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016). The field survey for the Reconnaissance flora and vegetation survey (RPS 2023) was undertaken between 29 September and 7 October in 2021 and between 7 September and 9 September in 2022.

The Reconnaissance flora and vegetation survey (RPS 2023) of 1,445 ha covered 78% of the Native Vegetation Clearing Area (Appendix R) and includes 82% of the Banksia low open woodland vegetation within the Native Vegetation Clearing Area. Considerable survey effort has been expended across the multiple seasons by the flora and vegetation surveys, all of which have included a targeted search component, to identify conservation significant flora species (Table 6).

The dwarf green kangaroo paw has a restricted distribution within the Project Area with the single record detected within Banksia low open woodland vegetation (RPS 2023). Banksia low open woodland vegetation is broadly distributed throughout the RPS (2023) survey area with 45.4 ha recorded. At a regional scale, representative vegetation is described for Vegetation Association 1030 (Low woodland; *Banksia attenuata* and *Banksia menziesii*) (Shepherd et al. 2002 and Beard et al. 2013). The majority of the 25 records of dwarf green kangaroo paw identified from the DBCA's Threatened and Priority flora database within a 25 km radius occurred in Vegetation Association 1030. The broad Vegetation Association 1030 has 63.8% (86,014 ha) of its pre-European extent remaining within the Swan Coastal Plain IBRA bioregion (Section 4.4.1.1) (Government of Western Australia 2019).

Figure D illustrates potential habitat for dwarf green kangaroo paw within 12 km of the Project Area, which is comprised of surveyed Banksia low open woodland vegetation and government mapped Native Vegetation Extent (DPIRD-005) intersected by Vegetation Association 1030 (DPIRD-006). The Vegetation Association 1030 mapping is a broad indication of potential habitat as it has not been specifically surveyed for dwarf green kangaroo paw, and it does not account for specific habitat preferences (e.g., in winter wet depressions). There is over 18,000 ha of potential habitat for dwarf green kangaroo paw within 12 km of the Project Area; comprised of 83.01 ha of surveyed banksia low open woodland vegetation (RPS 2023) and 18,019.55 ha of government mapped Native Vegetation Extent (DPIRD-005) overlaid by Vegetation Association 1030 (DPIRD-006). The Proposed Action will clear approximately 3.88 ha (or 4.7%) of the surveyed banksia low open woodland vegetation within and proximate to the Project Area, which represents 0.022% out of the over 18,000 ha of potential habitat for dwarf green kangaroo paw within 12 km of the Project Area.

The EPA has an objective to seek to retain at least 30% of the pre-European extents of each ecological community, consistent with recognised retention level (EPA 2016; Commonwealth of Australia 2001). The EPA uses vegetation associations as the basis for regional representation of biodiversity (EPA 2016). The remaining pre-European extent for the broad Vegetation Association 1030 has achieved the over 30% retention objective, hence biodiversity values including potential habitat for the dwarf green kangaroo paw is well represented across the Swan Coastal Plain IBRA bioregion.

Of the 83.01 ha of banksia low open woodland vegetation recorded by the flora and vegetation surveys, approximately 3.88 ha (or 4.7%) of the banksia low open woodland vegetation or potential dwarf green kangaroo paw habitat is proposed to be cleared. As a result, more than 95.3% of the potential dwarf green kangaroo paw habitat is predicted to be retained. The only known record of the dwarf green kangaroo paw and 95.3% of the potential dwarf green kangaroo paw habitat will be avoided (Figure D).

Given the optimal survey conditions and timing, lack of winter wet depressions, single record, avoidance of more than 95.3% of the potential dwarf green kangaroo paw habitat and perennial growth habit, the residual risk to the dwarf green kangaroo paw is extremely low.

5.4.4 Lesueur hakea

The Lesueur hakea (*Hakea megalosperma*) is listed as Vulnerable under the EPBC Act. It is a spreading, lignotuberous shrub that grows between one and two m high. Lesueur hakeas occur on grey sand and loam on lateritic or rocky hills and flower white-cream to pink around May to June (Western Australian Herbarium 1998–) (Plate 9).



Plate 9: Lesueur hakea (*Hakea megalosperma*)

(Source: Western Australian Herbarium 1998–)

5.4.4.1 Database and field survey records

Eight records of the Lesueur hakea are reported within a 25 km search radius of a central point within the Project Area by the DBCA's Threatened and Priority flora database. The eight DBCA records were found at or near Mullering Road in the following locations:

- At Mullering Road, approximately 25 m south of road
- At Mullering Road north and south verges, approximately 5.2 km to 6.1 km east of Brand Highway
- At Mullering Road, approximately 5.2 km to 6.1 km east of Brand Highway
- At Mullering Road, approximately 5.5 km to 6.2 km east of Brand Highway
- At Mullering Road, approximately 5.6 km east of Brand Highway
- Approximately 5.5 km east of Mullering Brook nature reserve, approximately 15 km west of Dandaragan

Four Lesueur hakea records (four individuals) were detected within proteaceous heath vegetation by the Reconnaissance flora and vegetation survey (RPS 2023). The four records were found in the road reserve of Mullering Road. The Lesueur hakea was not detected within any other vegetation community or by any of the preceding flora and vegetation surveys (Ecologia Environment 2016; Outback Ecology 2014; Outback Ecology 2010).

Lesueur hakea records and potential habitat for Lesueur hakea within and proximate to the Project Area are illustrated in Figure B and Figure E.

5.4.4.2 Weather and climate conditions

The Bureau of Meteorology winter rainfall conditions for the Reconnaissance flora and vegetation survey (RPS 2023) were optimal for flowering (19 mm above the long-term winter average in 2021 and 77 mm above the long-term winter average in 2022) (Table 19) (Bureau of Meteorology 2025). The above average rainfall conditions resulted in good flowering in both annual and perennial species. The timing of the Reconnaissance flora and vegetation assessment (RPS 2023), which included targeted searches for all conservation significant flora species including the Lesueur hakea, occurred outside of the Lesueur hakea's flowering time. The Lesueur hakea is a conspicuous shrub that grows between 1 – 2 m high and persists in the landscape permanently. There is therefore high confidence that occurrences of this species would have been detected by the targeted searches outside of its flowering season (if present).

5.4.4.3 Survey effort

A targeted search for the Lesueur hakea (RPS 2023) was undertaken in accordance with the Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016). The field survey for the Reconnaissance flora and vegetation survey (RPS 2023) was undertaken between 29 September and 7 October in 2021 and between 7 September and 9 September in 2022.

The Reconnaissance flora and vegetation survey (RPS 2023) of 1,445 ha covered 78% of the Native Vegetation Clearing Area (Appendix R) and includes 90% of the proteaceous heath vegetation within the Native Vegetation Clearing Area. Considerable survey effort has been expended across the multiple seasons of flora and vegetation surveys, all of which have included a targeted search component, to identify conservation significant flora species (Table 6).

The Lesueur hakea has a restricted distribution within the Project Area with all records detected within proteaceous heath vegetation (RPS 2023). Proteaceous heath vegetation is broadly distributed throughout the RPS (2023) survey area with 20.5 ha recorded. At a regional scale, representative vegetation is described for Vegetation Association 1031 (Mosaic: Shrublands; hakea scrub-heath / Shrublands; dryandra heath) (Shepherd et al. 2002 and Beard et al. 2013). The 8 records of Lesueur hakea identified from the DBCA's Threatened and Priority flora database within a 25 km radius occurred in the Vegetation Association 1031. The broad Vegetation Association 1031 has 34.5% (83,217 ha) of its pre-European extent remaining within the Geraldton Sandplains IBRA bioregion (Section 4.4.1.1) (Government of Western Australia 2019).

Figure E illustrates potential habitat for Lesueur hakea within 12 km of the Project Area, which is comprised of surveyed proteaceous heath vegetation and government mapped Native Vegetation Extent (DPIRD-005) intersected by Vegetation Association 1031 (DPIRD-006). The Vegetation Association 1031 mapping is a broad indication of potential habitat as it has not been specifically surveyed for Lesueur hakea, and it does not account for specific habitat preferences (e.g., on lateritic or rocky hills). There is over 18,000 ha of potential habitat for Lesueur hakea within 12 km of the Project Area; comprised of 58.49 ha of surveyed proteaceous heath vegetation (RPS 2023) and 18,264.60 ha of government mapped Native Vegetation Extent (DPIRD-005) overlaid by Vegetation Association 1031 (DPIRD-006). The Proposed Action will clear approximately 1.21 ha (or 2.1%) of the surveyed proteaceous heath vegetation within and proximate to the Project Area, which represents 0.007% out of the over 18,000 ha of potential habitat for Lesueur hakea within 12 km of the Project Area.

The EPA has an objective to seek to retain at least 30% of the pre-European extents of each ecological community, consistent with recognised retention level (EPA 2016; Commonwealth of Australia 2001). The EPA uses vegetation associations as the basis for regional representation of biodiversity (EPA 2016). The remaining pre-European extents for the broad Vegetation Association 1031 has achieved the over 30% retention objective, hence biodiversity values including potential habitat for the Lesueur hakea is well represented across the Geraldton Sandplains IBRA bioregion.

Of the 58.49 ha of proteaceous heath vegetation recorded by the flora and vegetation surveys within and proximate to the Project Area, approximately 1.21 ha (or 2.1%) of the proteaceous heath vegetation or potential Lesueur hakea habitat is proposed to be cleared. All known records of the Lesueur hakea and 97.9% of surveyed potential Lesueur hakea habitat within and proximate to the Project Area will be avoided (Figure E)).

Given the species is conspicuous shrub around 1–2 m, a low number of records (four) were detected during surveys, and that avoidance of more than 97.9% of the potential Lesueur hakea habitat has been achieved, the residual risk to the Lesueur hakea is extremely low.

5.4.5 Sandplain duck orchid

The sandplain duck orchid (*Caleana dixonii*) is listed as Endangered under the EPBC Act. It is a tuberous, perennial herb which grows between 0.09–0.2 m high. Sandplain duck orchids occur in sandy soils, occasionally over laterite (Department of the Environment 2025b). The species flowers yellow-brown around October to January (Western Australian Herbarium 1998–) (Plate 10).

Sandplain duck orchid's unique flowers and tall height make it easily distinguishable from other members of the *Paracaleana* species group, including its nearest relative, the Broad-billed duck orchid (*Paracaleana triens*). Sandplain duck orchid has a longer and narrower linear leaf and longer flowering stem than the Broad-billed duck orchid. It has paler flowers and longer labellum lamina (Department of the Environment 2025b).



(Source: Western Australian Herbarium 1998–)

Plate 10: Sandplain duck orchid (*Caleana dixonii*)

5.4.5.1 Database and field survey records

Two records of the sandplain duck orchid are reported within a 25 km search radius of a central point within the Project Area by the DBCA's Threatened and Priority flora database. The DBCA records were found in sandy soils with the vegetation structure and associated species described as:

- Open heath of *Banksia* species, *Nuytsia floribunda* and *Eucalyptus tottiana* over mixed shrubs dominated by myrtaceous species. *Calothamnus quadrifidus*, *Regelia ciliata*, *Adenanthos cygnorum*, *Melaleuca* and *Verticordia* species

- Low heathland of *Allocasuarina humilis*, *Calothamnus sanguineus*, *Hibbertia hypericoides*, *Conospermum stoechadis*, *Melaleuca* sp., *Eremaea* sp.

No sandplain duck orchid records were detected by any of the flora and vegetation surveys undertaken for the Proposed Action (RPS 2025; RPS 2023; Ecologia Environment 2016; Outback Ecology 2014; Outback Ecology 2010).

Sandplain duck orchid records and potential habitat for sandplain duck orchid within and proximate to the Project Area are illustrated in Figure B and Figure F.

5.4.5.2 Weather and climate conditions

The Bureau of Meteorology winter rainfall conditions for the Reconnaissance flora and vegetation survey (RPS 2023) were optimal for orchid emergence and flowering (19 mm above the long-term winter average in 2021 and 77 mm above the long-term winter average in 2022) (Table 19) (Bureau of Meteorology 2025). The above average rainfall conditions resulted in good flowering in both annual and perennial species. The timing of the targeted search for sandplain duck orchid was optimal for detection of this species in flower.

The Bureau of Meteorology winter rainfall conditions for the Targeted star sun-orchid and sandplain duck orchid searches (RPS 2025) were optimal for orchid emergence and flowering (64 mm above the long-term winter average in 2024). However, rainfall in the month prior to the survey (September 2024) was minimal at approximately 20% of the long-term September average. Although September 2024 had significantly less rainfall than the long-term September average, environmental conditions for 2024 were generally considered favourable for the emergence and detectability of terrestrial flora species.

5.4.5.3 Survey effort

Targeted searches for the sandplain duck orchid (RPS 2023, RPS 2025) were undertaken in accordance with the Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016) and the draft Survey Guidelines for Australia's Threatened Orchids (Commonwealth of Australia 2013). The field survey for the Reconnaissance flora and vegetation survey (RPS 2023) was undertaken between 29 September and 7 October in 2021 and between 7 September and 9 September in 2022, and the field survey for the Targeted star sun-orchid and sandplain duck orchid searches (RPS 2025) was undertaken between 21 and 24 October 2024. The targeted searches were undertaken during the known flowering time of sandplain duck orchid, around October to January (Western Australian Herbarium 1998–).

The Project Area overlies the Yerramullah, Nylagarda, Bassendean and Boothendarra systems, which are comprised of sands and laterite (Figure Q). Sandplain duck orchids require deep sands beneath tall dense shrublands with scattered banksias or in heathland in shallow sand over laterite (Department of the Environment 2025b). These habitats relative to the Native Vegetation Clearing Area were thoroughly searched during the 2024 targeted searches at the appropriate flowering time, with no records identified (RPS 2025).

Prior to the commencement of the 2024 targeted searches, a brief reconnaissance search was undertaken for the known populations of star sun-orchids within the clearing area as recorded by RPS (2023) to ascertain the emergence and flowering status of a known population. The known flowering time of star sun-orchid (late September to November) overlaps the known flowering time of sandplain duck orchid (October to January); therefore, it is considered that the sandplain duck orchid would have been detectable if present during the October 2024 targeted searches.

The Reconnaissance flora and vegetation survey (RPS 2023) of 1,445 ha covered 78% of the Native Vegetation Clearing Area (Appendix R). The Targeted star sun-orchid and sandplain duck orchid searches (RPS 2025) survey area was 83.46 ha in size, however the searched areas and transects were broader as they extended outside the survey area (as shown in Appendix E). Therefore, the targeted searches covered 100% of the Native Vegetation Clearing Area.

Considerable survey effort has been expended across the multiple seasons by the flora and vegetation surveys, all of which have included a targeted search component, to identify conservation significant flora species (Table 6). The additional survey in 2024 is considered to cover the multiple seasons required in the draft Survey Guidelines for Australia's Threatened Orchids (Commonwealth of Australia 2013) and ensured that 100% of the potential habitat for sandplain duck orchid the Native Vegetation Clearing Area was surveyed.

The two records of sandplain duck orchid identified from the DBCA's Threatened and Priority flora database within a 25 km radius occurred in the Vegetation Association 1030 (Low woodland; *Banksia attenuata* and *Banksia menziesii*) (Shepherd et al. 2002 and Beard et al. 2013). The DBCA records were found in low open heath vegetation (Section 5.4.5.1), rather than in low banksia woodland vegetation setting. At a regional scale, representative vegetation is described for Vegetation Association 1031 (Mosaic: Shrublands; hakea scrub-heath / Shrublands; dryandra heath) (Shepherd et al. 2002 and Beard et al. 2013). The broad Vegetation Association 1031 has 34.5% (35,527 ha) of its pre-European extent remaining within the Geraldton Sandplains IBRA bioregion (Section 4.4.1.1) (Government of Western Australia 2019).

Figure F illustrates potential habitat for sandplain duck orchid within 12 km of the Project Area, which is comprised of surveyed proteaceous heath vegetation and government mapped Native Vegetation Extent (DPIRD-005) overlaid by Vegetation Association 1031 (DPIRD-006). The Vegetation Association 1031 mapping is a broad indication of potential habitat as it has not been specifically surveyed for sandplain duck orchid, and it does not account for specific habitat preferences (e.g., in sandy soils, occasionally over laterite). There is over 18,000 ha of potential habitat for sandplain duck orchid within 12 km of the Project Area; comprised of 58.49 ha of surveyed proteaceous heath vegetation (RPS 2023) and 18,264.60 ha of government mapped Native Vegetation Extent (DPIRD-005) overlaid by Vegetation Association 1031 (DPIRD-006). The Proposed Action will clear approximately 1.21 ha (or 2.1%) of the surveyed proteaceous heath vegetation within and proximate to the Project Area, which represents 0.007% out of the over 18,000 ha of potential habitat for sandplain duck orchid within 12 km of the Project Area.

The EPA has an objective to seek to retain at least 30% of the pre-European extents of each ecological community, consistent with recognised retention level (EPA 2016; Commonwealth of Australia 2001). The EPA uses vegetation associations as the basis for regional representation of biodiversity (EPA 2016). The remaining pre-European extent for the broad Vegetation Association 1031 has achieved the over 30% retention objective, hence biodiversity values including potential habitat for the sandplain duck orchid is well represented across the Geraldton Sandplains IBRA bioregion.

Of the 58.49 ha of proteaceous heath vegetation recorded by the flora and vegetation surveys within and proximate to the Project Area, approximately 1.21 ha (or 2.1%) of the proteaceous heath vegetation or potential sandplain duck orchid habitat is proposed to be cleared. Approximately 97.9% of surveyed potential sandplain duck orchid habitat within and proximate to the Project Area will be avoided (Figure F).

Given the timing of the field surveys coincided with the sandplain duck orchid flowering time, no supporting records within the Project Area have been identified as a result of the surveys, and more than 97.6% of the potential sandplain duck orchid habitat has been avoided, it is logical to conclude that the sandplain duck orchid is likely to be locally absent from the Project Area and that the residual risk to the sandplain duck orchid is extremely low.

5.4.6 Glossy-leafed hammer orchid

The glossy-leafed hammer orchid (*Drakaea elastica*) is listed as Endangered under the EPBC Act. It is a tuberous, perennial herb that grows between 0.12–0.3 m high. Glossy-leafed hammer orchids occur on white or grey sands in low-lying situations adjoining winter-wet swamps and flower red, green and yellow around October to November (Western Australian Herbarium 1998–) (Plate 11).



(Source: Western Australian Herbarium 1998–)

Plate 11: Glossy-leaved hammer orchid (*Drakaea elastica*)

5.4.6.1 Database and field survey records

No records of the glossy-leaved hammer orchid are reported within a 25 km search radius of a central point within the Project Area by the DBCA's Threatened and Priority flora database (Figure B). No glossy-leaved hammer orchid records were detected by any of the flora and vegetation surveys undertaken for the Proposed Action (RPS 2023; Ecologia Environment 2016; Outback Ecology 2014; Outback Ecology 2010).

5.4.6.2 Weather and climate conditions

The Bureau of Meteorology winter rainfall conditions for the Reconnaissance flora and vegetation survey (RPS 2023) were optimal for orchid emergence and flowering (19 mm above the long-term winter average in 2021 and 77 mm above the long-term winter average in 2022) (Table 19) (Bureau of Meteorology 2025). The above average rainfall conditions resulted in good flowering in both annual and perennial species. The timing of the targeted search for glossy-leaved hammer orchid was optimal for detection of this species in flower.

5.4.6.3 Survey effort

The Reconnaissance flora and vegetation survey (RPS 2023) of 1,445 ha covered 78% of the Native Vegetation Clearing Area (Appendix R). Considerable survey effort has been expended across the multiple seasons by the flora and vegetation surveys, all of which have included a targeted search component, to identify conservation significant flora species (Table 6).

Glossy-leaved hammer orchid grows on white or grey sands in low-lying areas adjoining winter-wet swamps (Western Australian Herbarium 1998–). There are no winter wet swamps in the Project Area (Figure R) hence the preferred habitat conditions for this species are not present within the Project Area.

Given the timing of the field surveys coincided with the glossy-leaved hammer orchid flowering time, lack of supporting records and lack of preferred habitat (winter wet swamps) it is logical to conclude that the glossy-leaved hammer orchid is likely to be locally absent from the Project Area.

6 IMPACT ASSESSMENT

An assessment of the impacts of the Proposed Action on threatened flora, TEC, threatened and migratory birds is provided in this section:

- Section 6.1 provides an analysis of key impacts anticipated across both construction and operation on each of the identified MNES
- Sections 6.2 and 6.3 go on to detail other potential operational and cumulative impacts that may result from the Proposed Action
- Section 6.4 discusses the significance of the potential impacts regarding relevant guidelines issued under the EPBC Act

6.1 Key potential impacts

The key potential impacts to MNES from the Proposed Action are summarised in Table 21. The key potential impacts are predicted to be permanent. In the case of barotrauma and/or collision with the turbines or transmission line, death or injury are likely to result.

Table 21: Potential key impacts on MNES from the construction and operation of the Waddi Wind Farm

MNES	Phase	Impact class	Works / operations	Potential impacts
• Threatened flora • TEC	Construction	Direct	Vegetation clearing	• Permanent loss of up to 5.5 ha of native vegetation, including 0.3 ha of Banksia woodlands of the Swan Coastal Plain TEC • Habitat fragmentation
		Indirect		• Introduction and / or distribution of weeds, pests and diseases • Disturbance to surrounding native vegetation • Disturbance from dust deposition and surface water runoff
• Threatened fauna • Migratory birds	Operation	Indirect	Wind farm maintenance	Introduction and / or distribution of weeds, pests and diseases
	Construction	Direct	Vegetation clearing	• Permanent loss of up to: – 5.33 ha of high-quality Carnaby's cockatoo foraging habitat – 21 pine trees identified as high-quality Carnaby's cockatoo foraging and potential roosting habitat – 3 marri trees identified as potential Carnaby's cockatoo breeding, high-quality foraging and potential roosting habitat – 11 planted trees (non-native eucalypts) identified as low-quality Carnaby's cockatoo foraging and potential roosting habitat • Habitat fragmentation • Disturbance, injury or death during vegetation clearing and construction
		Indirect		• Introduction and / or distribution of weeds, pests and diseases • Disturbance to surrounding fauna habitat
	Operation	Direct	Turbine operation	• Collision with turbine / transmission lines causing death or injury • Barotrauma
		Indirect	Wind farm maintenance	Introduction and / or distribution of weeds, pests and diseases

The key potential impacts during construction are from habitat loss, habitat fragmentation and degradation from the proposed removal of vegetation / fauna habitat. The key potential risks from operation of the Proposed Action are the potential for avian species to collide with the wind turbines and transmission line or experience barotrauma. There are unlikely to be significant risks to MNES from project decommissioning.

6.1.1 Habitat loss, fragmentation, degradation and disturbance

6.1.1.1 Threatened flora species

6.1.1.1.1 Star sun-orchid

The approved Conservation Advice for star sun-orchid identified that the species grows in gravelly loam among low heath and scrub in *Eucalyptus marginata* and *Eucalyptus wandoo* woodland, and in low heath on lateritic hill tops (Department of the Environment, Water, Heritage and the Arts 2008c). This is consistent with where the star sun-orchids were identified by RPS (2023, 2025), on proteaceous heath vegetation over lateritic / gravelly hill top areas. The main threats to the species include fire during growing season, feral rabbit grazing, broad-scale vegetation clearing and increasing fragmentation of habitat, and potential threats from weed invasion, recreational activities, road widening activities and gravel extraction.

Proteaceous heath vegetation is broadly distributed throughout the RPS (2023) survey area with 20.5 ha recorded, with 41 star sun-orchid records identified by RPS (2023, 2025) on proteaceous heath vegetation over lateritic / gravelly hill top areas (Figure C). At a regional scale, there is 34.5% (83,217 ha) of the representative vegetation's (Vegetation Association 1031) pre-European extent remaining within the Geraldton Sandplains IBRA bioregion (Section 4.4.1.1) (Government of Western Australia 2019). Hence biodiversity values including potential habitat for the star sun-orchid is well represented across the Geraldton Sandplains IBRA bioregion.

Of the 58.49 ha of proteaceous heath vegetation recorded by the flora and vegetation surveys within and proximate to the Project Area, approximately 1.21 ha (or 2.1%) of the proteaceous heath vegetation or potential star sun-orchid habitat is proposed to be cleared. All known records of the star sun-orchid and 97.9% of surveyed potential star sun-orchid habitat within and proximate to the Project Area will be avoided (Figure C). The Proposed Action is unlikely to adversely affect habitat critical to the survival of the species.

Clearing of proteaceous heath vegetation (i.e. potential star sun-orchid habitat) has been proposed adjacent to existing cleared areas (e.g. sand tracks) where practicable to avoid fragmenting potential star sun-orchid habitat into smaller, isolated patches within the Project Area. Additional clearing of proteaceous heath vegetation is required slightly west of an existing sand track (by approximately 30 m) to construct an access track over Waddi Road. This was undertaken to avoid directly impacting 10 star sun-orchid individuals adjacent to the existing sand track.

Proteaceous heath vegetation is generally in Excellent condition with a low abundance of weed species (RPS 2023). Badgingarra Conservation Park (Lot 4134 on Deposited Plan 240347; Crown reserve 41986) has a history of soil borne *Phytophthora* dieback occurrences, mainly due to the historic mineral sand mining activities in the area. The *Phytophthora* dieback status within the Project Area is not known, as no *Phytophthora* dieback assessment has been undertaken. There is the potential for Declared Pests, other weed species and *Phytophthora* dieback to be introduced and / or distributed via plant machinery or support vehicles during vegetation clearing and construction. Vehicle movements required during maintenance of the operational wind farm may also act as vectors for transfer.

Disturbance to proteaceous heath vegetation outside of the Native Vegetation Clearing Area has the potential to occur during ground disturbance activities (e.g. accidental clearing, dust deposition). Additional management and monitoring actions are proposed during pre-construction, construction and operation of the Proposed Action (Table 23) to reduce the potential for star sun-orchids located outside the Native Vegetation Clearing Area to be materially impacted by such disturbance.

The narrowest separation distances between star sun-orchid records and the Native Vegetation Clearing Area are shown in Figure 15, within the Waddi Road reserve, and in Figure 16, adjacent to the proposed transmission line. A 5 m minimum buffer from the Native Vegetation Clearing Area was achieved around each of the star sun-orchid records, except for one star sun-orchid record (1 individual) to the south, where the individual was able to be avoided having regard to the GPS survey accuracy level of ± 3.65 m (Figure 15).

6.1.1.1.2 Dwarf green kangaroo paw

The approved Conservation Advice for dwarf green kangaroo paw identified that the species grows in winter-wet depressions where it grows on grey sandy clay loam, or grey sand, in low post-fire regenerating heath (Department of the Environment, Water, Heritage and the Arts 2008d). The main threats to the species include inappropriate fire regimes and physical disturbance, and potential threats from dieback.

Banksia low open woodland vegetation is broadly distributed throughout the RPS (2023) survey area with 45.4 ha recorded, with one record of dwarf green kangaroo paw detected within Banksia low open woodland vegetation (RPS 2023) (Figure D). At a regional scale, there is 63.8% (86,014 ha) of the representative vegetation's (Vegetation Association 1030) pre-European extent remaining within the Swan Coastal Plain IBRA bioregion (Section 4.4.1.1) (Government of Western Australia 2019). Hence biodiversity values including potential habitat for the dwarf green kangaroo paw is well represented across the Swan Coastal Plain IBRA bioregion.

Of the 83.01 ha of banksia low open woodland vegetation recorded by the flora and vegetation surveys, approximately 3.88 ha (or 4.7%) of the banksia low open woodland vegetation or potential dwarf green kangaroo paw habitat is proposed to be cleared. As a result, more than 95.3% of the potential dwarf green kangaroo paw habitat is predicted to be retained. The only known record of the dwarf green kangaroo paw and 95.3% of the potential dwarf green kangaroo paw habitat will be avoided (Figure D).

Clearing of Banksia low open woodland vegetation (i.e. potential dwarf green kangaroo paw habitat) has been proposed adjacent to existing cleared areas (e.g. sand tracks) to avoid fragmenting potential dwarf green kangaroo paw habitat into smaller, isolated patches within the Project Area.

Banksia low open woodland vegetation is generally in Excellent condition with a low abundance of weed species (RPS 2023). Badgingarra Conservation Park (Lot 4134 on Deposited Plan 240347; Crown reserve 41986) has a history of soil borne *Phytophthora* dieback occurrences, mainly due to the historic mineral sand mining activities in the area. The *Phytophthora* dieback status within the Project Area is not known, as no *Phytophthora* dieback assessment has been undertaken. There is the potential for Declared Pests, other weed species and *Phytophthora* dieback to be introduced and / or distributed via plant machinery or support vehicles during vegetation clearing and construction. Vehicle movements required during maintenance of the operational wind farm may also act as vectors for transfer.

Disturbance to Banksia low open woodland vegetation outside of the Native Vegetation Clearing Area has the potential to occur during ground disturbance activities (e.g. accidental clearing, dust deposition). It is not anticipated that operation of the wind farm would result in the potential for Banksia low open woodland vegetation situated within the Project Area to be materially impacted.

6.1.1.1.3 Lesueur hakea

The approved Conservation Advice for Lesueur hakea identified that the species is found in low heath on grey sand and lateritic gravel, on hilltops, ridges, amongst boulders, and occasionally with *Eucalyptus tottiana* in white, yellow or grey sand (Department of the Environment, Water, Heritage and the Arts 2008e). The main threats to the species include large-scale vegetation clearing and increasing fragmentation, and potential threats from dieback and too frequent fires.

Proteaceous heath vegetation is broadly distributed throughout the RPS (2023) survey area with 20.5 ha recorded, with four Lesueur hakea records identified by RPS (2023) on proteaceous heath vegetation. At a regional scale, there is 34.5% (83,217 ha) of the representative vegetation's (Vegetation Association 1031) pre-European extent remaining within the Geraldton Sandplains IBRA bioregion (Section 4.4.1.1) (Government of Western Australia 2019). Hence biodiversity values including potential habitat for the star sun-orchid is well represented across the Geraldton Sandplains IBRA bioregion.

Of the 58.49 ha of proteaceous heath vegetation recorded by the flora and vegetation surveys within and proximate to the Project Area, approximately 1.21 ha (or 2.1%) of the proteaceous heath vegetation or potential Lesueur hakea habitat is proposed to be cleared. All known records of the Lesueur hakea and 97.9% of surveyed potential Lesueur hakea habitat within and proximate to the Project Area will be avoided (Figure E). The Proposed Action is unlikely to adversely affect habitat critical to the survival of the species.

Clearing of proteaceous heath vegetation (i.e. potential Lesueur hakea habitat) has been proposed adjacent to existing cleared areas (e.g. sand tracks) where practicable to avoid fragmenting potential Lesueur hakea habitat into smaller, isolated patches within the Project Area. Additional clearing of proteaceous heath vegetation is required slightly west of an existing sand track (by approximately 30 m) to construct an access

track over Waddi Road. This was undertaken to avoid directly impacting 10 star sun-orchid individuals adjacent to the existing sand track (Section 6.1.1.1.1).

Proteaceous heath vegetation is generally in Excellent condition with a low abundance of weed species (RPS 2023). Badgingarra Conservation Park (Lot 4134 on Deposited Plan 240347; Crown reserve 41986) has a history of soil borne *Phytophthora* dieback occurrences, mainly due to the historic mineral sand mining activities in the area. The *Phytophthora* dieback status within the Project Area is not known, as no *Phytophthora* dieback assessment has been undertaken. There is the potential for Declared Pests, other weed species and *Phytophthora* dieback to be introduced and / or distributed via plant machinery or support vehicles during vegetation clearing and construction. Vehicle movements required during maintenance of the operational wind farm may also act as vectors for transfer.

Disturbance to proteaceous heath vegetation outside of the Native Vegetation Clearing Area has the potential to occur during ground disturbance activities (e.g. accidental clearing, dust deposition). It is not anticipated that operation of the wind farm would result in the potential for proteaceous heath vegetation situated within the Project Area to be materially impacted.

The proximity of existing infrastructure (e.g., unsealed road) to Lesueur hakea records identified by RPS (2023) and DBCA is presented in Figure E, which includes a record inside a paddock on a hill crest, in the Mullering Road reserve (4 records; approximately 3 – 30 m from existing road) and nearby access tracks (1 record; over 300 m from track). The Lesueur hakea records are located at least 250 m from the native vegetation clearing area and at least 40 m from the Disturbance Area. The Lesueur hakea records located proximate to the Native Vegetation Clearing Area, and Disturbance Area, will be protected from potential indirect impacts of dust deposition from increased road use due to wind farm operations or surface water runoff through the pre-construction, construction and operation management and monitoring measures proposed by the Proponent (Section 7.2). This includes installing using water carts to minimise dust generation, and imposing speed limits to reduce the already low potential for additional dust to be generated.

6.1.1.1.4 Sandplain duck orchid and glossy-leafed hammer orchid

The Project Area overlies the Yerramullah, Nylagarda, Bassendean and Boothendarra systems, which are comprised of sands and laterite (Figure Q). Sandplain duck orchids require deep sands beneath tall dense shrublands with scattered banksias or in heathland in shallow sand over laterite (Department of the Environment 2025b). These habitats were thoroughly searched during the 2024 targeted searches at the appropriate flowering time, with no records identified.

Glossy-leafed hammer orchid grows on white or grey sands in low-lying areas adjoining winter-wet swamps (Western Australian Herbarium 1998–). There are no winter wet swamps in the Project Area (Figure R) hence the preferred habitat conditions for this species are not present within the Project Area.

Given the timing of the field surveys coincided with the sandplain duck orchid and glossy-leafed hammer orchid flowering times, lack of supporting records and lack of preferred habitat for glossy-leafed hammer orchid, it is logical to conclude that these species are likely to be locally absent from the Project Area.

6.1.1.2 Threatened ecological community

Up to 0.3 ha of Banksia woodlands of the Swan Coastal Plain TEC in Excellent condition is proposed to be permanently lost. Approximately 12.4 ha of Banksia woodlands of the Swan Coastal Plain TEC has been avoided within the broader area covered by RPS (2023), Ecologia Environment (2016) and Outback Ecology (2014) surveys.

The buffered extent of the DBCA's ecological community records identifies that there are approximately 53,156 ha of Banksia woodlands of the Swan Coastal Plain TEC patches recorded within 25 km of the Project Area (RPS 2023). The Proposed Action will clear approximately 0.3 ha (or 0.0005%) out of more than 53,156 ha of the Banksia woodlands of the Swan Coastal Plain TEC present in the Proposed Action's regional area.

Clearing of Banksia woodlands of the Swan Coastal Plain TEC has been proposed adjacent to existing cleared areas (e.g. sand tracks) to avoid fragmenting banksia woodland vegetation into smaller, isolated patches within the Project Area.

Banksia woodlands of the Swan Coastal Plain TEC is generally in Excellent condition with a low abundance of weed species (RPS 2023; Ecologia Environment 2016; Outback Ecology 2014). Badgingarra Conservation Park (Lot 4134 on Deposited Plan 240347; Crown reserve 41986) has a history of soil borne

Phytophthora dieback occurrences, mainly due to the historic mineral sand mining activities in the area. The *Phytophthora* dieback status within the Project Area is not known, as no *Phytophthora* dieback assessment has been undertaken. There is the potential for Declared Pests, other weed species and *Phytophthora* dieback to be introduced and / or distributed via plant machinery or support vehicles during vegetation clearing and construction. Vehicle movements required during maintenance of the operational wind farm may also act as vectors for transfer.

Disturbance to Banksia woodlands of the Swan Coastal Plain TEC outside of the Native Vegetation Clearing Area has the potential to occur during ground disturbance activities (e.g. accidental clearing, dust deposition). It is not anticipated that operation of the wind farm would result in the potential for Banksia woodlands of the Swan Coastal Plain TEC situated within the Project Area to be materially impacted.

6.1.1.3 Threatened and migratory bird species

6.1.1.3.1 Carnaby's cockatoo

All known Carnaby's cockatoo breeding areas and night-roosts have been avoided during wind farm design (Figure 8, Figure 9 and Figure N). The extent of Carnaby's cockatoo foraging, potential breeding and potential roosting habitat proposed to be permanently lost within the Project Area to facilitate construction of the Proposed Action has been reduced to be as low as reasonably practicable and is expected to comprise:

- Up to 5.5 ha of native vegetation, 5.33 ha of which is identified as high-quality Carnaby's cockatoo foraging habitat
 - Avoidance of at least 143.54 ha (or 96%) of native vegetation within the Project Area identified as high-quality Carnaby's cockatoo foraging habitat by the flora, vegetation and fauna surveys
 - Avoidance of at least 1,063.18 ha (or 96%) of native vegetation within the Project Area identified as potential foraging habitat for Carnaby's cockatoo by government mapped Native Vegetation Extent (DPIRD-005) intersected by Vegetation Associations 7, 1030 and 1031 (DPIRD-006)
- Up to 21 pine trees identified as high-quality Carnaby's cockatoo foraging and potential roosting habitat
 - Avoidance of at least 68 pine trees (or 76%) of the pine trees identified by Terrestrial Ecosystems (2022)
- Up to 3 marri trees identified as potential Carnaby's cockatoo breeding, high-quality foraging and potential roosting habitat. None of the 3 marri trees have Carnaby's cockatoo nesting hollows
 - Avoidance of at least 63 marri trees (or 95%) of the marri trees identified by Terrestrial Ecosystems (2022). This includes all 11 marri trees identified by Terrestrial Ecosystems (2022) as having suitably sized hollows to support Carnaby's cockatoo nesting
 - Avoidance of at least 71.51 ha (or 93%) of government mapped Native Vegetation Extent (DPIRD-005) intersected by Vegetation Association 7 (DPIRD-006), where its vegetation descriptions are characteristic of potential roosting and breeding habitat for Carnaby's cockatoo.
- Up to 11 planted trees (non-native eucalypts) identified as low-quality Carnaby's cockatoo foraging and potential roosting habitat
 - Avoidance of at least 732 planted trees (non-native eucalypts) (or 99%) of the planted trees identified by Terrestrial Ecosystems (2022)

There is over 18,000 ha of potential Carnaby's cockatoo foraging habitat within conservation estates identified within 12 km of the Project Area, including Badgingarra National Park (13,108 ha), Badgingarra Conservation Park (Lot 4134 on Deposited Plan 240347; Crown reserve 41986) (2,369 ha), Lot 3901 on Deposited Plan 209568 (Crown Reserve 27216) (1,074 ha), Unnamed Nature Reserve (1,012 ha), Wonderrah Nature Reserve (439 ha) and Minyulo Nature Reserve (86 ha). Additionally, there are substantial areas of Carnaby's cockatoo habitat outside of the conservation estates and Crown reserves that are also utilised for foraging, roosting and nesting (Figure 8, Figure 9, Figure 12, Figure N and Figure O). Given the local abundance of Carnaby's cockatoo foraging habitat and the avoidance of known Carnaby's cockatoo breeding areas and night-roosts, the loss of a relatively minor extent of foraging, potential breeding and potential roosting habitat is considered unlikely to alter the breeding cycle of Carnaby's cockatoo within the local Cooljarloo area or more regionally.

The Project Area is characterised by a variety of habitats but is primarily cleared agricultural land with remnant patches of native vegetation. Within the transmission line alignment Badgingarra Conservation Park (Lot 4134 on Deposited Plan 240347; Crown reserve 41986) and Lot 3901 on Deposited Plan 209568 (Crown Reserve 27216) represent consolidated vegetation extents. Clearing of Carnaby's cockatoo foraging habitat has been proposed adjacent to existing cleared areas (e.g. sand tracks) where practicable to avoid fragmenting native vegetation extents into smaller, isolated patches within the Project Area. Additional clearing of proteaceous heath vegetation is required slightly west of an existing sand track (by approximately 30 m) to construct an access track over Waddi Road. This was undertaken to avoid directly impacting 10 star sun-orchid individuals adjacent to the existing sand track.

Carnaby's cockatoo is highly mobile and can use discrete habitat patches as 'stepping-stones' whilst traversing through the Cooljarloo landscape. It is not considered that the minor reductions in extent of foraging, potential breeding and potential roosting habitat would alter the existing local connectivity values associated with the Project Area or broader regional flock movements.

There is a potential risk presented by operating turbines adversely impacting the Carnaby's cockatoo's ability to use foraging habitat in the Project Area. The Proposed Action will involve installing 18 turbines, positioned 600 m – 2,600 m from each other in a north-south orientation on higher ground with an RSA of approximately 44 m – 206 m. The turbines would be in cleared paddocks, which do not contain preferred foraging habitat, and there are large separation distances between turbines where potential foraging habitat is present (e.g., Waddi Road reserve, Mullering Road reserve). Based on the BCE (2025) surveys, Carnaby's cockatoo were observed flying below 44 m for 99.60% of the recorded bird time, and the highest Carnaby's cockatoos flights were recorded at 50 m on four separate occasions, which involved single birds over lower ground and were outside of the turbine array. Carnaby's cockatoo spent most of the time roosting and foraging, either on the ground or on vegetation. This was true for individual birds and large flocks. When foraging and roosting in native vegetation or paddocks, groups of Carnaby's cockatoo would slowly move through the vegetation by leap frogging over birds that were perched on vegetation or on the ground. As Carnaby's cockatoos predominantly fly below the proposed RSA, are unlikely to be attracted to the turbines due to the lack of foraging, roosting or breeding habitat underneath, the position of turbines across the Project Area is staggered, and because potential foraging habitat is available elsewhere in the Project Area, it is not considered that the operating turbines would prevent Carnaby's cockatoo from using potential foraging habitat in the Project Area.

Carnaby's cockatoo foraging habitat is generally in high quality condition (Terrestrial Ecosystems 2022; Ecologia Environment 2016; Outback Ecology 2014). Badgingarra Conservation Park (Lot 4134 on Deposited Plan 240347; Crown reserve 41986) has a history of soil borne *Phytophthora* dieback occurrences, mainly due to the historic mineral sand mining activities in the area. The *Phytophthora* dieback status within the Project Area is not known, as no *Phytophthora* dieback assessment has been undertaken. There is the potential for Declared Pests, other weed species and *Phytophthora* dieback to be introduced and / or distributed via plant machinery or support vehicles during vegetation clearing and construction. Vehicle movements required during maintenance of the operational wind farm may also act as vectors for transfer. The introduction and / or distribution of these degradational vectors within the Project Area would negatively influence foraging value for Carnaby's cockatoo.

The transmission lines are proposed to be constructed and operated above retained native vegetation. Most native vegetation within the transmission line alignment is low-lying (less than three m in height), however the marri trees have an upper height strum of 16 m (Terrestrial Ecosystems 2022). Foraging evidence by Carnaby's cockatoo was observed proximate to the proposed transmission line, within Low Open Woodland *Eucalyptus tottiana*, Banksia Woodland over Myrtaceous Heath mapped vegetation (Figure O). There is a potential need to undertake selective canopy trimming of some the marri trees that will be situated directly under the transmission lines, to meet Western Power's clearance distance requirements. The selective canopy trimming is considered unlikely to result in the removal of, or damage to, any of the 11 hollow bearing trees with suitable dimensions for Carnaby's cockatoo nesting as trimming works will be confined to the upper canopies of the marri trees and the suitable hollows were observed within the trunks or dead / broken branches (Terrestrial Ecosystems 2022).

There is no evidence to suggest that any of the 11 marri trees with hollows of suitable dimensions for Carnaby's cockatoo nesting have been or are currently in use for either breeding (BCE 2025; Murdoch University 2024; Terrestrial Ecosystems 2022) or roosting (BCE 2025; Murdoch University 2024). Around half of the hollows identified by Terrestrial Ecosystems (2022) were occupied by bee hives / corella. BCE (2025) identified two potential breeding trees (wandoo or marri) with chewed hollows consistent with nesting Carnaby's cockatoos within the Project Area's north-eastern extent, and one potential breeding tree wandoo or marri) with chewed hollow/s consistent with nesting Carnaby's cockatoos and one confirmed nesting tree

(large dead wandoo) with a breeding pair and fledgling observed located adjacent to the Project Area's eastern boundary. The breeding pair were also subjected to harassment from western corellas at the nest (Plate 1). The three potential breeding trees and one breeding tree are located from 1.2 km to 4 km from the Disturbance Area. Carnaby's cockatoo breeding is generally clustered such that there are areas with a relatively high density of nests (Groom 2010).

At Coomallo Creek (approximately 40 km north-east of the Project Area), one third of nesting attempts were made in the same hollow that was used the previous season (Saunders 1982). These observations are supported by the important breeding areas (Cataby, Badgingarra and Moora) identified by Murdoch University (2024) and the DBCA's Threatened Fauna database (Figure N), which both show the clustering of records around the Cataby and Badgingarra breeding areas and an absence of records proximate to the marri trees. Although the marri trees are unlikely to be currently used by Carnaby's cockatoo, there is a potential disturbance, injury or death risk during vegetation clearing, construction and selective canopy trimming works, should the hollows be in use at the time when these activities are undertaken. This potential risk will be addressed by inspecting the hollows for signs of use prior to clearing, construction and selective canopy trimming works commencing.

There is also the potential collision / entanglement risk to Carnaby's cockatoo presented by the transmission lines being situated directly above the marri trees. There is already significant transmission line infrastructure in the Cooljarloo and Cataby areas required to support Tronox and Iluka's sand mining operations, Pinjar Power Station and the Yandin Wind Farm. There have been no reports of Carnaby's cockatoo being impacted by the transmission line infrastructure as part the Yandin or Badgingarra wind farm's monitoring programmes (Ecoscape 2019b; Ecoscape 2020, Alinta Energy 2022; Alinta Energy 2024). The movement patterns of Carnaby's cockatoo in the Cooljarloo and Cataby areas also appear to be unaltered from the installation of transmission line infrastructure required for the sand mining operations and energy projects (RPS 2010a; Murdoch University 2024).

Carnaby's cockatoo inhabits urban and peri-urban environments around the Perth and Peel regions, where above-ground transmission line infrastructure is common. The Proposed Action's proposed transmission line structures will consist of up to approximately 30 steel poles between 11 m and 40 m in height, with an average height of approximately 30 m, and a maximum sag of 7.5 m ground clearance in the mid-span between the steel poles. Therefore, the heights of the transmission lines will range from 7.5 m to 40 m above ground level. Flight heights of Carnaby's cockatoo flying between 6 m – 40 m were 40.9% of the recorded bird time (35.2% at 6-10 m, 3.7% at 11-15 m, 1.4% at 16-20 m, 0.3% at 21-25 m, 0.2% at 26-30 m and 0.1% at 36-40 m; BCE 2025). None of the recorded flight lines of Carnaby's cockatoo overflowed the proposed transmission line (Figure 11), however Carnaby's cockatoos have been observed flying over paddocks elsewhere in the Project Area and a foraging sign was recorded proximate to the proposed transmission line during the 2024-2025 surveys (Figure O), therefore Carnaby's cockatoo may forage and fly over or beneath the proposed transmission line. BCE (2025) noted that the proposed transmission line did not appear to be an area highly trafficked by Carnaby's cockatoos.

Overhead wires were present in the roost areas identified during the 2024-2025 site utilisation survey, across which Carnaby's cockatoos flew during the poor light of dusk. The species seemed aware of the man-made structures in the landscape (BCE 2025). Carnaby's cockatoo were not recorded perching on overhead transmission cables, towers or poles during the site utilisation survey on several similar projects in the Carnaby's cockatoos' range. However, it may take time for Carnaby's cockatoos to acclimatise to new structures in the landscape and to learn to avoid the proposed transmission line.

Given that this species inhabits areas with various scales of existing transmission line infrastructure and there have not been any significant impacts associated with the infrastructure identified for this species (DAWE 2022), it is likely that Carnaby's cockatoo have limited interactions with transmission line infrastructure when flying or roosting. This may be due to the somewhat laboured flight action of Carnaby's cockatoos, when compared to other bird species, which may provide opportunity for early visual detection of the transmission line infrastructure. Carnaby's cockatoo also were observed regularly perching on fence posts and wires in the Project Area (Plate 2), so the species are aware of and capable of distinguishing wires (BCE 2025). Two Carnaby's cockatoos were also observed foraging on vegetation next to established transmission lines west of Brand Highway, during the targeted orchid searches in October 2024 (Plate 3). Anecdotally, avian collisions appear to be the result of birds being struck by objects they did not see, rather than of birds failing to avoid visible objects (Smales 2006).

6.1.1.3.2 Fork-tailed swift

The fork-tailed swift is almost exclusively aerial, flying from less than 1 m to at least 300 m above ground and higher. Due to the broad range of habitats that this species overflies and its widespread occurrence it is not anticipated that a minor reduction of vegetation within the Project Area would materially impact this species.

6.1.1.3.3 Migratory sandpipers

The five key habitat types occurring within the Project Area are:

- Open pasture / cultivation area, often with scattered trees
- Remnant heathland vegetation
- Woodland remnants / elements
- Areas where various combinations of heathland and/ or woodland are associated with areas dominated by open pasture / cultivation habitats
- Aerial habitats above land for avifauna.

These habitat types do not align with the preferred habitats of curlew sandpiper, sharp-tailed sandpiper, pectoral sandpiper and common sandpiper. Hence these species will not be impacted by habitat loss, fragmentation or degradation because of the Proposed Action.

6.1.2 Turbine collision and barotrauma

6.1.2.1 Turbine collision and barotrauma

Wind farm impacts on birds including identified MNES (i.e. Carnaby's cockatoo and migratory birds) species can include:

- Direct collision with operating wind turbine blades or towers within the RSA
- Barotrauma because of rapid / excessive pressure changes at the tip of turbine blades
- Direct collision / entanglement with transmission lines.

There are several important factors that influence avian mortality through collision with turbines (Drewitt and Langston 2006). The location of wind farms is seen as a major factor, with those sited near wetlands, critical habitat areas, or along migratory flight paths having greatest impacts. The rates of collisions can be influenced by adverse weather conditions and poor visibility, flight characteristics of birds (e.g. fast flying, flocking, and nocturnal flyers may be more prone to collisions) and an individual species' ecology (e.g. migratory bird species may be less familiar with the area (Drewitt and Langston 2006)).

Turbulence created by the rotors (as a specific consideration) is also likely to affect avian species and result in a low level of mortality (Winkelman 1992). Turbulence is likely only to cause small disruptions to flight patterns to a degree that would not affect the individual bird. Very close to the blade turbulence may put birds at risk of direct physical harm either by causing collision with the blade or sudden changes in pressure (compression and rarefaction) that could cause barotraumas (physical injury to tissue especially that surrounding air cavities such as lungs and sinuses) (Baerwald et al. 2008).

The probability of adverse bird interactions appears to be both site specific and species specific. The most important step that can be taken to avoid adverse bird interactions is to locate facilities based on careful siting studies and away from critical habitat (Colson and Associates 1995). Fauna is likely to habituate to turbines in their environment. Where birds adapt to turbine presence, they may be able to avoid collision with it (i.e. avoidance behaviour).

The collision rates reported by proximate Dandaragan wind farms is around 6 birds annually.

Badgingarra Wind Farm reported:

- Seven carcasses of struck birds between July and November 2019 (Ecoscape 2019b):
 - One magpie lark (*Grallina cyanoleuca*)
 - Three Australian kestrel (*Falco cenchroides*)

- One Australian raven (*Corvus coronoides*)
- One corella (*Cacatua sanguinea*)
- One unidentifiable species
- Five carcasses of struck birds between March and April 2020 (Ecoscape 2020):
 - Three Australian kestrel (*Falco cenchroides*)
 - One Australian raven (*Corvus coronoides*)
 - One Australian magpie (*Cracticus tibicen*).

Yandin Wind Farm reported:

- Eleven carcasses of struck birds between December 2021 and November 2023 (Alinta Energy 2024):
 - Two Australian magpie (*Cracticus tibicen*)
 - Four Australian kestrel (*Falco cenchroides*)
 - One juvenile goshawk (*Accipiter fasciatus*)
 - One Australian ringneck (*Barnardius zonarius*)
 - Two feather spots belonging to corellas (*Cacatua sanguinea*)
 - One unidentifiable feather spot
- Seven birds were suspected of colliding with turbine blades during construction (Alinta Energy 2024):
 - Three wedge-tailed eagle (*Aquila audax*)
 - Three Australian kestrel (*Falco cenchroides*)
 - One black-shouldered kite (*Elanus axillaris*).

Birds of prey or raptor species appear to be particularly impacted by the Dandaragan wind farms neighbouring the Waddi Wind Farm. The affected species are considered common with regard to distribution, but lower in local abundance. Collision impacts may impact local populations of these species but are unlikely to affect regional populations.

There is also the potential collision / entanglement risk to Carnaby's cockatoo and migratory bird species presented by the transmission lines. There is already significant transmission line infrastructure in the Cooljarloo and Cataby areas required to support Tronox and Iluka's sand mining operations, Pinjar Power Station and the Yandin Wind Farm.

No Carnaby's cockatoo or migratory bird mortality has been reported at either of the two neighbouring operational wind farms, being the Badgingarra and Yandin wind farms (Ecoscape 2019b; Ecoscape 2020; Alinta Energy 2022; Alinta Energy 2024). Figure 5 shows the location of the Badgingarra and Yandin wind farms in relation to the Project Area.

6.1.2.1.1 Carnaby's cockatoo

Carnaby's cockatoo is a seasonal foraging visitor to the Project Area. Large, consolidated extents of Proteaceous Heath and Banksia woodland vegetation in the transmission line alignment provide high quality foraging habitat (RPS 2010a; Murdoch University 2024; Terrestrial Ecosystems 2022). Foraging evidence by Carnaby's cockatoo was observed proximate to the proposed transmission line, within Low Open Woodland *Eucalyptus tottiana*, Banksia Woodland over Myrtaceous Heath mapped vegetation (Figure O). In Cataby, Cooljarloo and Badgingarra, Carnaby's cockatoo flock movements generally occur along lowland vegetation corridors within valleys (RPS 2010a; Murdoch University 2024; BCE 2025), which accords with foraging, roosting and breeding habitat requirements of this species. A high number of Carnaby's cockatoo sightings were in the lower landscape along the Project Area's eastern boundary, with occasional forays of smaller groups across higher ground in the south and centre (BCE 2025). The Murdoch University (2024) data indicate a strong habitat preference for the consolidated vegetated extents containing foraging, roosting and breeding habitat that occur proximate to Brand Highway, when compared to the open agricultural paddocks proximate to the turbine locations, which also include small, isolated patches of habitat. Foraging signs were observed in native vegetation extents within and outside the Project Area. The distance from the lowland

vegetation corridors, where Carnaby's cockatoo is known to forage, to the elevated turbines is considerable and has been assessed on a turbine specific basis in Appendix W.

Flight heights of Carnaby's cockatoos were recorded from August 2024 to January 2025, as shown in Figure 11, and compared to the Proposed Action's most likely dimensions of the wind turbines RSA, where the turbines are positioned on higher ground and the turbines have an anticipated ground clearance of at least 44 m (Table 4) (BCE 2025). For over 148 separate flights, Carnaby's cockatoos were observed flying below 44 m for 99.60% of the recorded bird time. On one occasion Carnaby's cockatoos were observed flying as high as 25 m over higher ground, near VP04, and there was a cluster of flights near VP01 which were at a maximum of 10 m over higher ground. The highest Carnaby's cockatoo flights were recorded at 50 m on four separate occasions, which involved single birds over lower ground and were outside of the turbine array.

These observations are consistent with the RPS (2010a) survey findings, where there were no records of Carnaby's cockatoo occurring within the assessed RSA (i.e. 40–152 m) in ridge top contexts nor of this species flying above 152 m. This is likely due to avoidance of moderate to high wind velocities that characterise the wind farm site on a daily basis and the somewhat laboured flight action of Carnaby's cockatoos. As such, it is considered unlikely that local populations of this species would be at significant risk of collision because of the operational Waddi Wind Farm.

The Moora breeding area is located directly east of the Carnaby breeding area and research has found that inland breeding Carnaby's cockatoos generally move towards the coast to spend time at key foraging areas once young have fledged (Murdoch University 2024). There is a low risk that Carnaby's cockatoos from the Moora breeding area may traverse the turbine locations when migrating east to west. It has not been determined if the Carnaby's cockatoos individuals are present all year, or if there is a turnover in individuals (BCE 2025). As such, it is uncertain whether the Carnaby's cockatoos are breeding and non-breeding visitors or are resident breeders.

Observations of Carnaby's cockatoo during wind farm monitoring have witnessed Carnaby's cockatoo adjusting their flight heights as they approach turbines (Mike Bamford pers. obs.). Similar behaviour has been noted when a loose flock of about 30 of Carnaby's cockatoos crossed the Brand Highway, flying up to about 10 m when crossing the highway despite the absence of traffic; this suggested that the Carnaby's cockatoo were aware of the risk from traffic (Mike Bamford pers. obs.).

Western Power's incident data for the SWIS network has recorded a maximum of 1 – 2 confirmed black cockatoo collisions annually (personal communication, L. V. Gorp, 20 June 2024). The SWIS network extends from Kalbarri in the north, Kalgoorlie-Boulder in the east, and Ravensthorpe in the south-east (Government of Western Australia 2021) and encompasses over 101,100 km of transmission and distribution lines (AEMO 2025). Therefore, the SWIS network is found throughout the modelled distribution of the three threatened black cockatoo species, Carnaby's cockatoo, forest red-tailed cockatoo and Baudin's cockatoo (DAWE 2022). It is unknown if Western Power's annual collision records involve Carnaby's cockatoo. Western Power advised that the confirmed black cockatoo collision records likely underrepresent the actual incidents involving black cockatoos, due to the limitations in collecting incident records when black cockatoo collisions occur, and that species can be unidentifiable following an interaction with the lines. The proposed transmission line of 8 km represents an increase of 0.008% to the SWIS network. Based on the low collision rates of black cockatoos across the broader SWIS network, and that the proposed transmission line presents a very minor increase to the SWIS network (0.008%), the likelihood of Carnaby's cockatoos colliding with the proposed transmission line within the Project Area is considered to be low.

Carnaby's cockatoo was recorded during the 2017 avian fauna assessment (38 records) and 2021–2023 bird observations (thirteen occasions) conducted for the Yandin Wind Farm (Ecologia Environment 2017, Alinta Energy 2022; Alinta Energy 2024). The Badgingarra Wind Farm was found to be used as part of daily Carnaby's cockatoo foraging flight patterns with counts ranging from individual birds up to flocks of 300 to 400 birds. Carnaby's cockatoo was the most recorded species accounting for 36.1% of observations (3,541 counted) in 2018 (Ecoscape 2018) and 44% of observation (923 counted) in 2019 (Ecoscape 2019a). No Carnaby's cockatoo mortality has been reported at either the Badgingarra or Yandin wind farms (Ecoscape 2019b; Ecoscape 2020; Alinta Energy 2022; Alinta Energy 2024). This may be due to Carnaby's cockatoo:

- Utilising habitat proximate to the windfarm, but not including the turbine locations, which have been situated in cleared agricultural lands (Murdoch University 2024, BCE 2025)
- Flock movements following large, consolidated vegetation extents (Murdoch University 2024)
- Flying at heights below rotor height (RPS 2010a, Ecoscape 2018, Ecoscape 2019a; Alinta Energy 2022, Alinta Energy 2024, BCE 2025)

- Visual detection of the turbine blades (Smales 2006)
- Avoidance of moderate to high wind velocities (RPS 2010a) or operating turbines (Mike Bamford pers. obs.).

On this basis, Carnaby's cockatoo is considered to be at low risk of collision or barotrauma from the operating Waddi Wind Farm turbines. The risk of collision / entanglement presented by the transmission lines is also considered to be low.

6.1.2.1.2 Fork-tailed swift

No fork-tailed swifts were seen or heard during the large amount of sampling undertaken in late October, December 2024 and January 2025 when they may be present in Western Australia (BCE 2025). A long-term monitoring project (30 years; approximately 1,320 person-days) in the adjacent Cooljarloo Mine has not encountered fork-tailed swifts, and Dr Mike Bamford has observed the species twice in the region during a bird-watching career spanning nearly half a century. The fork-tailed swift is considered likely to occur very infrequently over the Project Area. The fork-tailed swift is almost exclusively aerial, flying from less than 1 m to at least 300 m above ground level and higher. There is potential for this species to fly at RSA height if flocks were to move through the area under some seasonal conditions. However, the fork-tailed swift has considerable aerial ability and is likely to easily avoid collision. No fork-tailed swift mortality has been reported at either the Badgingarra or Yandin wind farms (Ecoscape 2019b; Ecoscape 2020; Alinta Energy 2022; Alinta Energy 2024). On this basis, the fork-tailed swift is considered to be at low to negligible risk of collision or barotrauma from the operating Waddi Wind Farm turbines. The risk of collision / entanglement presented by the transmission lines is also considered to be low to negligible.

6.1.2.1.3 Migratory sandpipers

Migratory bird species were found to primarily frequent or move through / between lowland areas where more suitable habitat for these species occurs. Local flyway orientations were considered unlikely to traverse the Project Area, due to the general north to south alignment of drainage basins and coastal wetlands, although the potential for some intermittent east to west bird movements may exist, due to the temporary nature of regional wetlands in response to periodic inundations, particularly those in the east (RPS 2010a).

Migratory sandpipers are likely to follow the open water habitats through the Moore River catchment from the north when limited open water resources are available and are extremely unlikely to traverse the Project Area where no habitat exists for these species. No migratory sandpiper mortality has been reported at either the Badgingarra or Yandin wind farms (Ecoscape 2019b; Ecoscape 2020; Alinta Energy 2022; Alinta Energy 2024). On this basis, migratory sandpipers are considered to be at low risk of collision or barotrauma from the operating Waddi Wind Farm turbines. The risk of collision / entanglement presented by the transmission lines is also considered to be low.

6.1.2.2 Turbine specific impact assessment

The proposed turbine locations are in areas that have been cleared for agriculture. The turbine locations are proximate to small, isolated patches of foraging habitat for Carnaby's cockatoo, but are spatially separated from the consolidated vegetated extents containing foraging, roosting and breeding habitat for this species. The Project Area is considered potential habitat for the fork-tailed swift. There is no wetland habitat for migratory sandpiper species within the Project Area.

Risks from turbine operation to Carnaby's cockatoo, fork-tailed swift and the four migratory sandpiper species from each of the 18 individual turbines is outlined in Appendix W. The distances to the migratory bird records and potential wetland habitat are indicated in Figure K. The separation distances from the turbines to the Carnaby's cockatoo habitat / isolated vegetation / trees are indicated in Figure O.

The turbine specific impact assessment (Appendix W) broadly considered the risk to Carnaby's cockatoo, fork-tailed swift and migratory sandpiper species from the operation of individual turbines.

All the turbines are separated from the key Carnaby's cockatoo foraging habitat within the Crown reserves to the west of the turbines by least 3 km and on average by 5.8 km (Appendix W; Figure O). The consolidated extents of native vegetation within the Crown reserves, which are also associated with the transmission line alignment, provide high-quality foraging habitat for Carnaby's cockatoo and support local and regional flock movements (RPS 2010a; Murdoch University 2024). All the turbines are separated from DBCA managed

Conservation estates by at least 2 km, in the case of the Minyulo Nature Reserve, and on average by 5.1 km. These consolidated extents of native vegetation also provide high-quality foraging habitat for Carnaby's cockatoo.

Turbines are situated closer to the smaller isolated patches of potential Carnaby's cockatoo foraging habitat assessed by Terrestrial Ecosystems (2022) within the agricultural landscape. Separation distances between these small, isolated patches of potential Carnaby's cockatoo foraging habitat and turbines ranged from 15 m (WTG 11) to 350 m (WTG 06, WTG 018) Appendix W; Figure O). These extents of potential Carnaby's cockatoo foraging habitat were not identified to be in active use by Terrestrial Ecosystems (2022) nor are they considered locally or regionally important to Carnaby's cockatoo flock movements (Murdoch University 2024). Foraging evidence by Carnaby's cockatoo was observed in the larger extents of native vegetation within and outside the Project Area (Figure O) and Carnaby's cockatoos frequently foraged in Banksia heath and Marri woodland, however foraging was also opportunistically observed in cropped paddocks of canola and lupin, and on wild radish as weed species.

Turbines are situated a significant distance from DBCA held migratory bird records, between 6.6 km (WTG 17) to over 20 km (WTG 01). There is seasonal wetland habitats located to the between the coast and the DBCA managed conservation estates to the west of the Project Area that would provide habitat for migratory sandpiper species (Figure K). No seasonal wetland habitat has been mapped to the east of the Project Area, indicating that it would be unlikely for migratory sandpiper species to traverse the turbine field to access other wetland habitats.

The assessment concluded that the overall risk to these species from each individual turbine is low, based on the significant separation distances between the turbines and key foraging habitat resources, likelihood of occurrence within the RSA and potential collision risk associated with each species. Specifically, Carnaby's cockatoo flock movements generally occur along lowland vegetation corridors within valleys (RPS 2010a; Murdoch University 2024), which are spatially separated from the higher elevation cleared areas where the turbines are located by at least 3 km and on average by 5.8 km. Carnaby's cockatoo flight heights were predominantly below the proposed RSA (anticipated 44 – 206 m), flying above 44 m for 0.40% of the recorded bird time over 148 separate flights. Furthermore, these four flights were recorded of single birds flying at 40 m or above and were in the lower areas of the landscape (BCE 2025).

Fork-tailed swifts have not been recorded at the Project Area, or during a 30-year monitoring project in the adjacent Cooljarloo Mine and has been observed twice by Dr Mike Bamford in the region during a bird-watching career spanning nearly half a century (BCE 2025). The species is likely to occur very infrequently over the Project Area. This species has considerable aerial ability and is likely to easily avoid collision if infrequently present.

Migratory sandpipers are likely to follow the open water habitats through the Moore River catchment from the north when limited open water resources are available and are extremely unlikely to traverse the Project Area where no habitat exists for these species.

6.2 Other potential operational impacts

Table 22 provides a high-level assessment of the other potential impacts to MNES identified by the Commonwealth as part of the DCCEE request for additional information from the construction and operation of the wind farm.

Table 22: Other potential impacts on MNES from the construction and operation of the Waddi Wind Farm

MNES	Potential impacts	Assessment
• Carnaby's cockatoo • Fork-tailed swift • Migratory sandpipers	Low air pressure zones around the blades effecting the behaviour of protected species	• Turbulence is likely only to cause small disruptions to flight patterns to a degree that would not affect the individual bird. Very close to the blades, turbulence may put birds at risk of direct physical harm either by causing collision with the blade or sudden changes in pressure (compression and rarefaction) that could cause barotraumas (physical injury to tissue especially that surrounding air cavities such as lungs and sinuses) (Baerwald et al. 2008) • The collision rates reported by proximate Dandaragan wind farms is around 6 birds annually, which comprise common bird species. No Carnaby's cockatoo or migratory bird mortality has been reported at either the Badgingarra or Yandin wind farms (Ecoscape 2019b; Ecoscape 2020; Alinta Energy 2022; Alinta Energy 2024) • Barotrauma because of rapid / excessive pressure changes at the tip of turbine blades is assessed in Section 6.1.2.1 for Carnaby's cockatoo, fork-tailed swift and migratory sandpipers. These MNES are considered to be at low risk of barotrauma from the operating Waddi Wind Farm turbines.
	Alienation and landscape sterilisation (i.e. behavioural avoidance of species to habitat near turbines, at various temporal and spatial scales)	• The probability of adverse bird interactions appears to be both site specific and species specific. The most important step that can be taken to avoid adverse bird interactions is to locate facilities based on careful siting studies and away from critical habitat (Colson and Associates, 1995). It has been shown that fauna can habituate to turbines in their environment. Where birds adapt to turbine presence, they may be able to avoid collision with it (i.e. avoidance behaviour) • The proposed turbine locations are in areas that have been cleared for agriculture. The turbine locations are proximate to small, isolated patches of foraging habitat for Carnaby's cockatoo, but are spatially separated from the consolidated vegetated extents containing foraging, roosting and breeding habitat for this species • The generalised Carnaby's cockatoo flock movements identified by Murdoch University (2024) in accord with the observations of Carnaby's cockatoo movement patterns identified by RPS (2010a) (i.e. movement of Carnaby's cockatoo occur along lowland woodland corridors within valleys) and BCE (2025) (i.e., majority of sightings located in the lower landscape along the eastern boundary). These areas contain large, consolidated extents of banksia woodland and proteaceous heath communities that meet foraging requirements of Carnaby's cockatoo. The Murdoch University (2024) data indicate a strong habitat preference for the consolidated vegetated extents containing foraging, roosting and breeding habitat that occur proximate to Brand Highway, when compared to the open agricultural paddocks proximate to the turbine locations. It is not anticipated that the existing flock movement patterns would be materially altered because of the operational wind farm
	Impact of shadow "flicker", blade "glint", blade throw and night lighting	• Shadow flicker results from wind turbine blades passing between the sun and a receptor point. A receptor point could be an individual bird. Shadow flicker may potentially occur under certain combinations of geographical position and time of day. Due to the nature of the sun, the effect can only occur for limited periods during a day and on limited days in a year. It is generally accepted that shadow flicker ceases to be a problem when the receptor point is greater than ten blade diameters from the wind farm. In the case of the Waddi Wind Farm, this equates to a distance of around 1 km (Wind Prospect 2011). The turbines are situated at least 3 km from the key consolidated vegetation extents to the west that are seasonally frequented by Carnaby's cockatoo flocks, and at least 2 km from vegetation extents to the east used for frequented by Carnaby's cockatoo during the 2024-2025 site utilisation survey (BCE 2025), hence shadow flicker is considered unlikely to materially alter the existing use of these areas for foraging or existing flock movement patterns • Glinting is the effect of light being reflected from turbine blades. This usually occurs when the blades are wet or rotating in strong sunshine. The likely incidence of glinting is impossible to predict, but experience suggests that this is a relatively rare occurrence, especially with modern turbine blades, which have non-reflective coatings. Glinting will generally occur when the sun is at a low angle and is therefore more likely to occur in the middle of the day in winter rather than summer, or early morning or late afternoon throughout the year. The locations that will primarily be affected will be within 1 km, where the turbines lie directly between the viewer and the sun. Glinting is significantly reduced when non-reflective paints are used, and this will be the case for the blades of the Waddi Wind Farm turbines (Wind Prospect 2011) • Rotor failures resulting in blade throw are relatively rare with data describing such events limited (Carbone and Afferrante 2013). The turbines have been located in cleared agricultural land, away from the Carnaby's cockatoo habitat, which has reduced the risk of blade throw resulting in a loss of foraging habitat or potential impacts to individual birds • It has long been known that sources of artificial light attract birds, as evidenced by night-migrating birds in North America and Europe. Lighting is probably the most important factor under human control that affects mortality rates of birds colliding with all structures (Longcore et al. 2008). Most bird mortality at communication towers for example, occurs in poor weather with low cloud in autumn and spring, i.e. during migration periods (Longcore et al. 2008). Aviation safety lighting will not be required on the wind turbines constructed as part of the Proposed Action. However, the turbines do have external stair lighting which would be used as needed during operations (including at night if required). Construction and operational activities by site personnel are expected to occur during daylight hours therefore the Proposed Action is not anticipated to require night-time lighting on its buildings. However, there may be lighting on the operation and maintenance facility which could attract birds to the artificial light. The location of this facility is shown in Figure 1. Building lighting will be baffled and directed to avoid excessive light spillage and security lighting will be baffled to direct it towards the area requiring lighting and not skyward. The turbines and operation and maintenance facility have been located in cleared agricultural land, away from the Carnaby's cockatoo known roost area (approximately 1 km from the nearest turbine and approximately 3 km from the operation and maintenance facility). • With the implementation of the proposed lighting on turbines and the operation and maintenance facility, that operations will be predominantly during the day and night lighting for turbines will used as needed, the risk of night lighting disorientating Carnaby's cockatoos resulting in potential collisions is considered to be low.
	Analysis of the volume, composition, origin, destination and route for vehicle movements and other traffic likely to be generated during construction and operational phases, including a breakdown for over-dimension and heavy vehicles and erosion from road construction	• A total of approximately 17,855 vehicle movements are anticipated during construction. These movements are expected to comprise a mix of b-doubles, semi-trailers, OSOM low loaders and extending platform trailers, concrete trucks, water carts and cars/utility vehicles. A total of approximately 200 OSOM loads are anticipated as part of construction to transport the control room, tower sections, nacelles, turbine drivetrain, turbine hub and turbine blades to site. OSOM movements are intended to be transported from Henderson (AMC) by road generally via the Tonkin and Brand Highways to the Project Area. All wind turbine components will be delivered via the main site access points off Mullering Road. An OSOM route survey has been undertaken and has not identified the need for any additional vegetation clearance to facilitate OSOM movements to site • During operations, traffic movements will be comparable to baseline levels with approximately 1,066 car/utility and semi-trailer loads expected annually. A Traffic Management Plan is required to be prepared as a condition of the Development Approval and Works in Road Reserve application relating to the Proposed Action (see Section 9) • Traffic management measures are required to be implemented during construction to address Condition 9 of the Shire of Dandaragan's Planning Approval (Appendix X). Specifically – A Traffic Management Plan is being prepared to meet the Development Approval conditions and requirements of Main Roads Western Australia including: ○ Details of the selected transportation route ○ Detailed traffic management measures ○ Transportation of materials to the Project Area ○ Obtaining the necessary written approvals / permits from Main Roads WA Heavy Vehicle Operations Branch ○ The transport of all divisible and indivisible loads and acquisition of necessary permits for transport of these loads • The Proponent is engaging in ongoing consultation with both the Shire of Dandaragan and Main Roads Western Australia in relation to preparation of the Traffic Management Plan. A separate Oversize Overmass Transport Management Plan is also being prepared at the request of Main Roads Western Australia • Collision with motor vehicles is an important threatening factor for Carnaby's cockatoos (DPaW 2013). The proximity of foraging habitat and pooled water to roadsides put Carnaby's cockatoos at risk of collision with vehicles. Observations of Carnaby's cockatoo during wind farm monitoring have witnessed Carnaby's cockatoo adjusting their flight heights as they approach traffic, where a loose flock of about 30 Carnaby's cockatoos crossed the Brand Highway, flying up to about 10 m when crossing the highway despite the absence of traffic (BCE 2025). This suggested that the Carnaby's cockatoos were aware of the risk from traffic

MNES	Potential impacts	Assessment
		(Mike Bamford pers obs.). There will be a minor increase in vehicle movements compared to baseline levels during construction and a negligible increase in vehicle movements compared to baseline levels during operation
		With the implementation of the Traffic Management Plan and Oversize Overmass Transport Management Plan and the minimal increase to vehicle movements compared to baseline levels, and Carnaby's cockatoo observed flight behaviour in avoiding traffic, the risk of collision with vehicles during construction and operation is considered to be low
	Assessment of noise impact associated with construction and operation of the Proposed Action, including a description of all relevant impacts at various wind speeds, temporal and spatial variables and under various meteorological scenarios	- Noise may indirectly impact avian fauna behaviour through disruptions to nesting, roosting and foraging behaviour - Noise will be generated during all phases of the Proposed Action, with emissions from heavy machinery operation during construction likely to be the key consideration for fauna species (i.e. highest volume). Noise impacts during construction will be localised and temporary in nature - Noise management measures are required to be implemented during construction and operation to address Conditions 12 to 18 of the Shire of Dandaragan's Planning Approval (Appendix X) - In addition, the following noise management actions are proposed to address the potential noise risks to key fauna species during construction: - Site contractor(s) must undertake an environmental induction, including information on required noise management actions - All equipment, machines and vehicles on site during construction are to be the quietest reasonably available consistent with operational requirements, and are to be routinely maintained to ensure effectiveness of noise suppression systems and equipment - Fixed and semi-permanent equipment (e.g. generators and compressors) are to be located as far from retained vegetation / fauna habitat as practicable - With the implementation of the proposed noise management actions and based on known habitat usage in the Cooljarloo area by Carnaby's cockatoo (and migratory bird species), noise levels during vegetation clearing, construction and operation are not expected to result in a material impact to local populations
- Star sun-orchid - Dwarf green kangaroo paw - Lesueur hakea - Banksia woodlands of the Swan Coastal Plain TEC - Carnaby's cockatoo	Bushfire risk, including changing climate patterns that may affect the Project Area and surrounding environments	- Bushfires within the Project Area have the potential to result in the loss of flora and fauna habitat and native vegetation. Avian species are highly mobile and can generally evade localised fires - The following bushfire management actions are proposed to address the potential bushfire risks to key fauna species: - Site contractor(s) to undertake an environmental induction, including information on required bushfire management actions - Maintain primary vehicle access routes within the approved works area to ensure access is available to emergency services (if needed) - Construction and operational works to comply with all total fire and/or a vehicle movement bans - Smoking will be limited to designated smoking areas, proximate to site buildings - Appropriate containers for cigarette disposal to be located in designated smoking areas - All site buildings will be fitted with smoke detectors and contain portable fire extinguishers. During fire danger season or periods of hot, dry weather all site vehicles will carry a fire extinguisher. All fire extinguishers will be checked on a 12-monthly basis - Flammable liquids and materials to be stored in bunded areas that are fitted with appropriate fire extinguishers - During total fire bans, 'hot work' such as welding, grinding, soldering or gas cutting will be prohibited, unless an exemption is first obtained under the <i>Bush Fires Act 1954</i> - With the implementation of the proposed bushfire management actions the risk of loss of flora and fauna habitat and native vegetation during vegetation clearing, construction and operation is considered to be low
- Fork-tailed swift - Migratory sandpipers	Presence and prevalence of plant diseases (such as dieback disease <i>Phytophthora</i> spp., or any other plant diseases)	- Plant pathogens (e.g. <i>Phytophthora</i> dieback) have the potential to be introduced and spread within the Project Area during vegetation clearing, construction and operation. Where these works are adjacent to susceptible native vegetation (e.g. banksia woodlands, proteaceous heath), the introduction / spread of <i>Phytophthora</i> dieback has the potential to result in vegetation death. This has implications for Threatened flora species which may rely upon the habitat for survival, Carnaby's cockatoo that utilise these areas as foraging habitat and Banksia woodlands of the Swan Coastal Plain TEC which may form part of the adjacent vegetation assemblage - The potential for indirect impacts to occur to the adjoining vegetation (e.g. through introduction and spread of <i>Phytophthora</i> dieback or weeds, edge effects) will be managed through the implementation of the following general hygiene protocols: - Clean earth-moving machinery and vehicles of soil and vegetation prior to entering the Disturbance Area - Soil to be moved in dry conditions - No <i>Phytophthora</i> dieback infested or weed impacted soil, mulch, fill or other material is brought into the Disturbance Area - Movement of machines and other vehicles to be restricted to cleared access tracks and works area within the Disturbance Area - Prior to vegetation clearing / construction commencing a <i>Phytophthora</i> dieback survey of the Native Vegetation Clearing Area will be undertaken by a <i>Phytophthora</i> dieback specialist. The findings and recommendations of the <i>Phytophthora</i> dieback survey will inform the implementation of the proposed hygiene protocols. - With the implementation of the agreed hygiene protocols during vegetation clearing, construction and operation the risk presented by plant pathogens (e.g. <i>Phytophthora</i> dieback) is considered to be low

6.3 Cumulative impacts

The Project Area is proximate to six operating wind farms:

- Large-scale wind farms: **Badgingarra Wind Farm:** APA's Badgingarra Wind Farm is situated approximately 20 to 35 km north-west of the Waddi Wind Farm and consists of 37 Siemens 3.6-MW wind turbine generators installed with a hub height of 85 m and tip height of 150 m (APA 2024a)
- **Emu Downs Wind Farm:** APA's Emu Downs Wind Farm is situated immediately to the south of the Badgingarra Wind Farm and is approximately 15 to 20 km north-west of the Waddi Wind Farm. The Emu Downs Wind Farm consists of 48 1.65-MW wind turbine generators installed with a hub height of 68.5 m (APA 2024b)
- **Yandin Wind Farm:** Alinta Energy's Yandin Wind Farm is situated approximately 10 to 25 km south-east of the Waddi Wind Farm and consists of 51 Vestas 4.2-MW wind turbine generators (Ratch and Alinta Energy 2024). The Yandin Wind Farm formed part of the Dandaragan Wind Farms proposal (EPBC 2011/6006; Section 3.1.2) along with the Waddi Wind Farm
- Small scale wind farms:
 - **Moora Microgrid:** Advanced Energy Resources' Moora Microgrid is situated approximately 35 km east of the Waddi Wind Farm and consists of five refurbished 0.5 MW wind turbine generators.
 - **West Hills Wind Farm:** BlairFox's West Hills Wind Farm is situated approximately 35 km south-west of the Waddi Wind Farm and consists of ten 0.5 MW wind turbine generators.
 - **Karakin Wind Farm:** BlairFox's Karakin Wind Farm is situated approximately 50 km south-west of the Waddi Wind Farm and consists of ten 0.5 MW wind turbine generators.

The Project Area is proximate to two proposed wind farm:

- **Parron Wind Farm:** Zephyr Energy Pty Ltd's Parron Wind Farm is situated approximately 16 to 30 km north-west of the Waddi Wind Farm. The Parron Wind Farm is proposed to consist of 79 x 6.2-MW wind turbine generators installed with a hub height of 149 m and tip height of 230 m (Zephyr Energy Pty Ltd 2024). The Proposed Action is awaiting a delegate decision.
- **Nilgen Wind Farm:** Pacific Hydro's Nilgen Wind Farm is situated approximately 40km south-west of the Waddi Wind Farm and is proposed to consist of 38 2.5 MW wind turbine generators. It is unclear whether the project is still being actively developed

All the wind farms have been / will be constructed in primarily cleared agricultural landscapes and have avoided direct impacts to native vegetation, flora and fauna habitat wherever practicable. Given the separation distances from the Project Area to the other wind farms potential cumulative effects from habitat loss, fragmentation, degradation and indirect disturbance associated with native vegetation clearing across the Dandaragan landscape are not anticipated.

At a regional scale, the broader Vegetation Associations 7, 1030 and 1031 that overlie the native vegetation types have more than 30% of their pre-European extents remaining within the Geraldton Sandplains and Swan Coastal Plain IBRA bioregions (Section 4.4.1.1). The EPA uses vegetation associations as the basis for regional representation of biodiversity (EPA 2016). The remaining pre-European extents for the broader Vegetation Associations 7, 1030 and 1031 have achieved the over 30% retention objective, hence biodiversity values including potential habitat for flora and fauna species and ecological communities, are well represented across both IBRA bioregions.

Large tracks of land lie between these operating wind farms and the Project Area offering a large amount of space in which highly mobile avian species (i.e. Carnaby's cockatoo and migratory bird species) can move through the Dandaragan landscape without being affected by the wind farms. Based on available information on bird collision from the Badgingarra and Yandin wind farms, it is anticipated that the operation of the Waddi Wind Farm could result in around 12 additional bird mortality events annually. Informed by the bird species identified by the collision monitoring at these sites, it is anticipated that the impacted birds would be relatively common species (e.g. Australian kestrel, Australian magpie, Australian raven). Collision impacts may impact local populations of these species but are unlikely to affect populations at a regional scale.

No Carnaby's cockatoo or migratory bird mortality has been reported at either the Badgingarra or Yandin wind farms (Ecoscape 2019b; Ecoscape 2020; Alinta Energy 2022; Alinta Energy 2024). In the case of Carnaby's cockatoo, this may be due to:

- Birds utilising habitat proximate to the windfarm, but not including the turbine locations, which have been situated in cleared agricultural lands (Murdoch University 2024, BCE 2025)
- Flock movements following large, consolidated vegetation extents (Murdoch University 2024)
- Flying at heights below rotor height (RPS 2010a, Ecoscape 2018, Ecoscape 2019a; Alinta Energy 2022; Alinta Energy 2024, BCE 2025)
- Visual detection of the turbine blades (Smales 2006)
- Avoidance of moderate to high wind velocities (RPS 2010a) or operating turbines (Mike Bamford pers. obs.).

In the case of migratory sandpipers, this is most likely due to a lack of wetland habitat proximate to the Project Area and the known migratory flight paths following the Moore River catchment when limited open water resources are available. In the case of the fork-tailed swift, this is most likely due to the species' very infrequent presence, the known flight heights of this species including an area well in excess of the RSA, considerably aerial ability and collision avoidance behaviours.

On this basis, it is considered unlikely that the operation of the Waddi Wind Farm would materially increase the cumulative risk to Carnaby's cockatoo or migratory birds.

6.4 Significance of potential impacts

Significance of impacts assessments (Appendix Y) have been undertaken for MNES identified by the Commonwealth as part of the DCCEE request for additional information from the construction and operation of the wind farm.

The significance of impacts assessments were undertaken using:

- Matters of National Environmental Significance: Significant Impact Guidelines 1.1 (Department of the Environment 2013); and
- In the case of Carnaby's cockatoo, an assessment using the referral thresholds presented in the Referral guideline for 3 WA threatened black cockatoo species (DAWE 2022)

The significance of impacts assessments identified that the potential impacts to threatened flora, TEC and migratory bird species from the operation of the Waddi Wind Farm are unlikely to be significant. However:

- Potential impacts to Carnaby's cockatoo from habitat loss were found to be at variance with two of the five referral thresholds identified in DAWE (2022) and one of the nine significant impact criteria identified in Department of the Environment (2013)
- Potential impacts to the Banksia woodlands of the Swan Coastal Plain TEC were found to be at variance with one of the nine significant impact criteria identified in Department of the Environment (2013)

7 PROPOSED AVOIDANCE AND MITIGATION MEASURES

As outlined in Section 3.2, a mitigation hierarchy framework has been implemented across all stages of development of the Proposed Action to minimise the key and other predicted impacts from construction and operation of the Proposed Action. The three key steps in implementation of the mitigation hierarchy are:

1. Avoid
2. Mitigate
3. Offset.

Key avoidance, mitigation and offset measures, including an analysis of the anticipated effectiveness of those measures are outlined in the Sections 7.1 to 7.5. Residual impacts that are otherwise unable to be avoided or mitigated, together with proposed offsets for those residual impacts, are outlined in Section 8.

7.1 Development of the Waddi Wind Farm

7.1.1 Avoidance

Key avoidance measures implemented during development of the Proposed Action (Section 3.2) have resulted in:

- Avoidance of direct impacts to all known records of Commonwealth listed Threatened flora species identified within the Project Area, including star sun-orchid, dwarf green kangaroo paw and Lesueur hakea
- Avoidance of at least 147.57 ha (or 96%) of the native vegetation surveyed by RPS (2023), Ecologia Environment (2016), Outback Ecology (2014) and Outback Ecology (2010) as part of the ecological assessments undertaken for the Proposed Action
- Avoidance of at least 12.4 ha (or 98%) of Banksia woodlands of the Swan Coastal Plain TEC within the Project Area.
- Avoidance of at least 143.54 ha (or 96%) of native vegetation within and proximate to the Project Area identified as high-quality Carnaby's cockatoo foraging habitat by the flora, vegetation and fauna surveys.
- Avoidance of at least 1,063.18 ha (or 99%) of native vegetation within the Project Area identified as potential foraging habitat for Carnaby's cockatoo by government mapped Native Vegetation Extent (DPIRD-005) intersected by Vegetation Associations 7, 1030 and 1031 (DPIRD-006).
- Avoidance of at least 71.51 ha (or 93%) of government mapped Native Vegetation Extent (DPIRD-005) intersected by Vegetation Association 7 (DPIRD-006), where its vegetation descriptions are characteristic of potential roosting and breeding habitat for Carnaby's cockatoo.
- Avoidance of at least 68 pine trees (or 76%) of the pine trees identified by Terrestrial Ecosystems (2022) identified as high-quality Carnaby's cockatoo foraging and potential roosting habitat.
- Avoidance of at least 63 marri trees (or 95%) of the marri trees identified by Terrestrial Ecosystems (2022) identified as high-quality Carnaby's cockatoo foraging, potential breeding and potential roosting habitat. This includes all 11 marri trees identified by Terrestrial Ecosystems (2022) as having suitably sized hollows to support Carnaby's cockatoo nesting.
- Avoidance of at least 732 planted trees (non-native eucalypts) (or 98%) of the planted trees identified by Terrestrial Ecosystems (2022) identified as low-quality Carnaby's cockatoo foraging and potential roosting habitat.
- Avoidance of at least 78 coastal blackbutt (*Eucalyptus tottiana*) trees (or 100%) which are of foraging and roosting value to Carnaby's cockatoo.

7.2 Construction and operation management

7.2.1 Mitigation

The management and monitoring actions which will be undertaken to mitigate potential impacts to MNES during vegetation clearing, construction and operation of the wind farm are identified in Table 23.

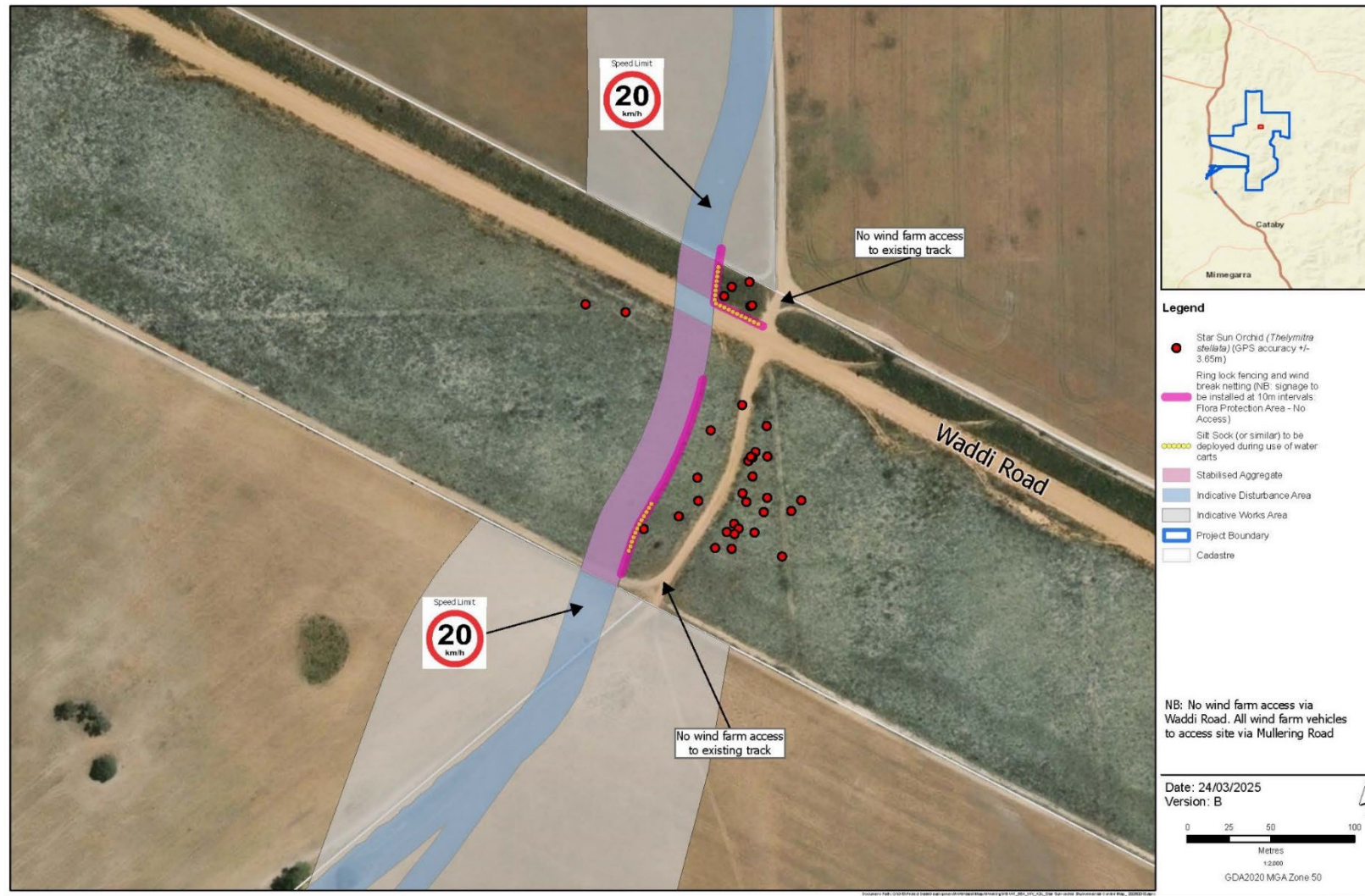
Table 23: Management action and monitoring summary

Environmental factor	Pre-construction	Construction and operation	Monitoring
- Threatened flora species - Banksia woodlands of the Swan Coastal Plain TEC	- All site personnel to undertake an environmental induction, including information on flora and vegetation, including identified Threatened flora species and Banksia woodlands of the Swan Coastal Plain TEC and associated management actions - Clearly demarcate the Disturbance Area (e.g. through survey and the deployment of star pickets and bunting) prior to the commencement of vegetation removal works to prevent accidental disturbance to retained vegetation and / or trees - Due to the proximity of the star sun-orchid records to the alternative Waddi Road access track: - the location of the star sun-orchid records is to be reviewed during their known flowering time (i.e. late September to November) using a differential GPS with a sub 1 metre accuracy. Revised locations of the star sun-orchid records must be mapped relative to the proposed Waddi Road access track. - the revised location of the star sun-orchid records be mapped relative to the alternative Waddi Road access track / Native Vegetation Clearing Area. The proposed clearing area will be modified (as required) to ensure that at least a 5 m separation distance is maintained between the clearing area and any star sun-orchid record - Installation of ring lock fencing along the boundary of the native vegetation clearing area, where a known star sun-orchid record is located within 20 m of the clearing area / existing cleared access track prior to clearing commencing (Figure 18 and Figure 19) - Fencing is proposed to form a barrier between the clearing area and retained vegetation to prevent accidental clearing from taking place and is proposed to be retained for the duration of construction - Signage to be installed at 10 m intervals: "Flora Protection Area – No Access" - Windbreak netting will be attached to the ring lock fencing for the duration of construction to minimise any encroachment of sand / dust during clearing / construction works into the retained vegetation - Fencing of retained vegetation containing known conservation significant flora records and provision of windbreak netting: - Is a standard management practice to address potential impacts from accidental clearing and dust deposition during construction projects; and - Has been demonstrated and proven to be an effective management measure to ensure ongoing persistence of native vegetation / flora species during construction works	- The Disturbance Area will be clearly defined and demarcated on appropriate plans, as well as on-site, and all site personnel responsible for vegetation removal are to be fully briefed on the removal task during toolbox meetings - Topsoil to be stockpiled and returned to disturbed areas during rehabilitation, where practicable - Removed native vegetation will be mulched on-site and disposed of at an appropriate off-site facility. Mulched vegetation may also be used for any on-site rehabilitation - No vegetation or weed material is to be burnt on-site under any circumstances - Due to the proximity of the star sun-orchid records to the alternative Waddi Road access track: - vegetation clearing will be undertaken outside of the star sun-orchid growing and flowering season (i.e. clearing will be undertaken during the period that the plant is below ground level) to reduce the risk to orchid individuals from dust deposition during their period of active growth and reproduction. - Dust suppression measures will be implemented for the duration of construction to minimise dust generation during clearing / construction works - During clearing / construction, water carts will be used as required in dust-generating conditions and when higher levels of traffic are anticipated through the Waddi Road access track. To reduce risk of runoff from water carts, silt socks (or similar) will be deployed where a known star sun-orchid record is located within 5 m of the clearing area / existing cleared access track (Figure 18) - Site access points north and south of the Waddi Road access track will be stabilised with a layer of aggregate to minimise dust generation prior to use by construction machinery - Speed limits (20 km/h maximum) will be introduced when vehicles are traversing areas where a known star sun-orchid record is located within 20 m (e.g. Waddi Road access track), to reduce the already low potential for additional dust to be generated. Signage indicating speed limits will be installed to ensure speed limits are adhered to (Figure 18 and Figure 19). - During periods of strong winds, water carts will be used on road sections within 20 m of a known star sun-orchid record until wind speeds have substantially decreased - During Wind Farm Operation - Speed limit signage will remain in place along the Waddi Road access track at 20 km/h to minimise dust generation from vehicle movements associated with intermittent maintenance and monitoring of the northern turbines and associated infrastructure - Rink lock fencing, windbreak netting and silt socks (or similar) will be removed post construction completion	- Site inspection of demarcated approved Disturbance Area to ensure that vegetation and tree removal is conducted in authorised areas only - Approved Disturbance Area to be surveyed post cessation of vegetation removal works - Any damage to vegetation outside the approved Disturbance Area will be: - Reinstated at the Proponent's cost - Carried out under the direction of a suitably qualified environmental consultant - Adopt reasonable management measures to ensure that the damaged areas are restored to pre-existing condition within the shortest possible time - Visual monitoring and inspection of the fencing and windbreak netting will be included in an environmental audit schedule to be implemented during construction to determine if or when repairs are required. Opportunistic visual observations of the fencing and windbreak netting may also be undertaken by other construction staff outside of the environmental audit schedule - Monitoring of all known star sun-orchid records will be undertaken on an annual basis, within the known flowering time of the species (i.e. late September to November), during construction - Monitoring of all known star sun-orchid records will be undertaken on an annual basis, within the known flowering time of the species (i.e. late September to November), for two years post construction completion
- Weed and pest species <i>Phytophthora</i> dieback	- Consultation with landowners on the location of known weed infestations (Condition 25 of the amended Shire of Dandaragan Planning Approval) - Agreement with land holders on weed measures to be implemented during construction (Condition 26 of the amended Shire of Dandaragan Planning Approval) - Prior to vegetation clearing / construction commencing a <i>Phytophthora</i> dieback survey of the Native Vegetation Clearing Area will be undertaken by a <i>Phytophthora</i> dieback specialist. The findings and recommendations of the <i>Phytophthora</i> dieback survey will inform the implementation of the proposed hygiene protocols. All site personnel to undertake an environmental induction, including information on required hygiene management actions	- Agreed land holder weed measures to be implemented during vegetation clearing, construction and operation (Condition 26 of the amended Shire of Dandaragan Planning Approval) - Agreed hygiene protocols to be implemented during vegetation clearing, construction and operation within the Disturbance Area - Restrict the movement of plant machinery and vehicles to within the limits of the Disturbance Area; and approved access tracks outside of the Disturbance Area but within the Project Area - Off-road vehicle use will be strictly controlled with no driving permitted off designated routes - Reduce the potential for weed establishment during vegetation clearing and construction activities through the minimisation of the total area of exposed ground surfaces	Regular inspections of the Disturbance Area will be undertaken for signs of weeds or pests

Environmental factor	Pre-construction	Construction and operation	Monitoring
- Carnaby's cockatoo - Migratory bird species	- All site personnel to undertake an environmental induction, including information on Carnaby's cockatoo and migratory bird species and associated management actions - Clearly demarcate the Disturbance Area and Native Vegetation Clearing Area on-site prior to the commencement of vegetation removal works to prevent accidental disturbance to retained vegetation and / or trees	- If earthworks are required to take place in areas with existing weed populations, precautions will be taken to prevent the weed contaminated material being transported to uncontaminated areas - Material containing weeds will not be used in rehabilitation, and machinery operating in areas of known weed contamination will be cleared before leaving the area - Remove or control any weeds growing / pests established within the Disturbance Area	- Site inspection of demarcated approved Native Vegetation Clearing Area to ensure that vegetation and tree (fauna habitat) removal is conducted in authorised areas only - Inspection of the works area at the start of each morning to check for injured fauna or for fauna that may have become entrapped in fences and trenches / pits. If any fauna is found to be trapped, a qualified wildlife handler will be contacted to rescue the animal and provide treatment if required - Approved Bird and Bat Management Plan to be implemented during operation
		- Clearing will be conducted at low speeds and towards the adjacent vegetation extents to provide the opportunity for ground dwelling fauna species to disperse into the adjacent vegetation - To avoid disrupting the breeding cycle of Carnaby's cockatoo: - Pre-clearing surveys within 100 m of the Native Vegetation Clearing Area will be undertaken by a suitably qualified fauna specialist prior to vegetation clearance - The suitably qualified fauna specialist to inspect hollows for signs of use prior to clearing, construction and selective canopy trimming works commencing - Should breeding Carnaby's cockatoos be found: - Clearing will not commence within 100 m of the breeding tree until breeding in the area has finished - Canopy trimming works will not be undertaken until breeding in the area has finished - Selective canopy trimming works will be confined to the upper canopies of the marri trees to avoid removal of hollows in the tree trunks - If native fauna is encountered during clearing works it should, initially, be allowed to make its own way from the works area. However, if this is not possible or practicable, a qualified wildlife handler will be contacted to relocate it - During vegetation disturbance works, a qualified wildlife handler will be on call to handle any injured, abandoned or otherwise visibly distressed fauna. The contact details of this person will be provided to the principal contractor's environmental manager. Where a qualified wildlife handler is not available and injured or distressed fauna is encountered during site works the environment manager should call the DBCA's Wildcare Helpline (08) 9474 9055 or a local veterinary hospital - Any trenching required should be kept open for only as long as necessary. Trenches should be inspected for fauna immediately prior to filling - Vehicle speeds traversing the Project Area will be low (<40 km/hr) to reduce the risk of fauna collision. Any incidents of fauna injury will be recorded - Recently identified fauna species will be included in daily pre-work toolbox meetings - No pets to be allowed on-site	
- Dust - Noise	All site personnel to undertake an environmental induction, including information on required dust and noise management measures	- Reduce the potential for dust to be generated from construction activities through the minimisation of the total area of exposed ground surfaces - Any temporary soil stockpiles to be located as far from retained vegetation / fauna habitat as practicable - Ensure all plant machinery carrying materials within and from the Project Area are covered and adequately secured to prevent drift during transportation - In the event of observations or reports of excessive dust levels, mitigation measures will be implemented (e.g. using water truck to dampen soil) - All equipment, machines and vehicles on site during construction are to be the quietest reasonably available consistent with operational requirements, and are to be routinely maintained to ensure effectiveness of noise suppression systems and equipment - Fixed and semi-permanent equipment (e.g. generators and compressors) are to be located as far from retained vegetation / fauna habitat as practicable	Dust levels to be observed during early vegetation clearing and construction works inspected to ascertain requirement for additional dust mitigation measures

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Environmental factor	Pre-construction	Construction and operation	Monitoring
Waste management	All site personnel to undertake an environmental induction, including information on required waste management measures	All waste generated by the Proposed Action is to be adequately contained and regularly removed from the Project Area by licensed waste contractor. Waste disposal receipts or certificates are to be retained as proof of disposal	Daily inspections to assess the adequacy of waste management measures, including recording signs of spills, leaks and unexpected or unauthorised discharges
Bushfire	All site personnel to undertake an environmental induction, including information on required fire management actions	The ERMP will include, at a minimum, the following bushfire management actions are proposed to address the potential bushfire risks to key fauna species: • Site contractor(s) to undertake an environmental induction, including information on required bushfire management actions • Maintain primary vehicle access routes within the approved works area to ensure access is available to emergency services (if needed) • Construction and operational works to comply with all total fire and/or a vehicle movement bans • Smoking will be limited to designated smoking areas, proximate to site buildings • Appropriate containers for cigarette disposal to be located in designated smoking areas • All site buildings will be fitted with smoke detectors and contain portable fire extinguishers. During fire danger season or periods of hot, dry weather all site vehicles will carry a fire extinguisher. All fire extinguishers will be checked on a 12-monthly basis • Flammable liquids and materials to be stored in bunded areas that are fitted with appropriate fire extinguishers • During total fire bans, 'hot work' such as welding, grinding, soldering or gas cutting will be prohibited, unless an exemption is first obtained under the <i>Bush Fires Act 1954</i>	Monitor weather forecast and plan work accordingly, where possible, reprioritise work that might be affected by total bans and/or vehicle movement bans
Rehabilitation	All site personnel are to undertake an environmental induction, including information on required rehabilitation actions	• Progressive rehabilitation of disturbance within the Disturbance Area for areas not required for the ongoing operation of the Proposed Action • Revegetation of any temporary access tracks after construction will need to consider seedling protection to avoid herbivory by rabbits .	Temporary access tracks and disturbed ground within the Disturbance Area (e.g. underground cabling, access track batters, around the turbine footprints) to be returned to pre-construction land use or landholder agreed outcome at the cessation of construction works



Waddi Wind Farm
Star Sun-orchid (*Thelymitra stellata*) Environmental Control Map

Figure 18: Star sun-orchid environmental control map, adjacent to Waddi Road



Figure 19: Star sun-orchid environmental control map, adjacent to proposed transmission line

7.3 Operational bird and bat monitoring

An Avian Fauna Collision Monitoring Program is required to be prepared to monitor the impact of the wind farm on avian fauna in the Project Area, specifically in respect to the endangered Carnaby's cockatoo, to address Condition 20 of the Shire of Dandaragan's Planning Approval (Appendix X). Additionally, a Bird and Bat Management Plan has been requested by DCCEEW as part of the request for additional information.

A draft Bird and Bat Management Plan has been prepared to address these two requirements (RPS 2025; Appendix Z). The draft Bird and Bat Management Plan demonstrates the long-term monitoring approach to be implemented during wind farm operation to:

- Mitigate and manage potential impacts to Carnaby's cockatoo, migratory birds and state-listed bird species associated with individual mortality from turbine and potentially transmission line collision and potential changes to species utilisation of the Project Area
- Mitigate and manage potential impacts to relevant non-threatened at-risk bird and bat species associated with individual mortalities from turbine and potentially transmission line collision and potential changes to species utilisation of the Project Area
- Apply an adaptive management framework to accommodate contingency triggers and associated contingency actions
- Undertake performance and compliance reporting and provide for independent environmental auditing
- The draft Bird and Bat Management Plan has been prepared to accord with DCCEEW's Environmental Management Plan Guidelines (DCCEEW 2024r).

7.4 Decommissioning

Decommissioning will likely involve the dismantling and removal of all wind turbines and supporting infrastructure. It is envisioned that similar management actions and monitoring tasks to those identified in Table 23 will be implemented during the decommissioning of the wind farm to reduce the potential for impacts to the existing environmental values.

All disturbed ground will be returned to pre-development land use or landholder agreed outcomes after the removal of the wind turbines and appropriate supporting infrastructure.

7.5 Effectiveness of proposed measures

A mitigation hierarchy framework has been followed throughout all stages of development of the Proposed Action.

The Proposed Action has been designed to ensure all future infrastructure is positioned within previously disturbed areas (wherever possible) to avoid impacts to MNES. Additional management and monitoring measures are proposed for risks of impact that are otherwise unable to be avoided.

A draft Bird and Bat Management Plan has been prepared to mitigate and manage potential impacts to Carnaby's cockatoo, migratory birds, state-listed and common local bird species associated with individual mortality from turbine and potential transmission line collision, as well as potential changes to species utilisation of the Project Area. The draft Bird and Bat Management Plan has been prepared in accordance with DCCEEW's Environmental Management Plan Guidelines (DCCEEW 2024r).

The avoidance actions undertaken during development of the Proposed Action have resulted in most of the Project Area's ecological values being maintained. The additional management and monitoring measures proposed throughout pre-construction, construction and operation are expected to support the maintenance of those values. The implementation of bird and bat management plans has proven to be effective in identifying species impacted by collision across multiple wind farm projects, including in close proximity to the Proposed Action, and providing an adaptive management framework which can be changed to accommodate the findings of carcass monitoring surveys (i.e. increase operational controls to reduce carcass numbers). Taken overall, the measures proposed are expected to be effective in avoiding, reducing and mitigating potential impacts to the identified MNES.

8 RESIDUAL IMPACTS AND PROPOSED OFFSET

8.1 Residual impacts

Avoidance and mitigation responses to reduce the potential impacts to the identified MNES from the construction and operation of the Waddi Wind Farm have been provided in Section 7. After the application of avoidance and mitigation responses, residual impacts to threatened flora species, Banksia Woodlands of the Swan Coastal Plain TEC, Carnaby's cockatoo and migratory birds remain. Specifically, these are:

- Threatened flora:
 - Permanent loss of up to 1.21 ha of proteaceous heath vegetation which is potential habitat for the star sun-orchid and the Lesueur hakea, which amounts to 98% of the proteaceous heath vegetation surveyed by RPS (2023) and Outback Ecology (2014)
 - Permanent loss of up to 3.88 ha of the banksia low open woodland vegetation, which is potential habitat for the dwarf green kangaroo paw, which amounts to 95% of the banksia low open woodland vegetation surveyed by RPS (2023), Ecologia Environment (2016) and Outback Ecology (2014)
- Banksia woodlands of the Swan Coastal Plain TEC:
 - Permanent loss of up to 0.3 ha of Banksia woodlands of the Swan Coastal Plain TEC in Excellent condition, which amounts to 2.3% of the Banksia woodlands of the Swan Coastal Plain TEC surveyed by RPS (2023), Ecologia Environment (2016) and Outback Ecology (2014)
- Carnaby's cockatoo:
 - Permanent loss of up to 5.33 ha of native vegetation identified as high-quality Carnaby's cockatoo foraging habitat, which amounts to 0.013% of the identified potential Carnaby's cockatoo foraging habitat within 12 km of the Project Area (40,156.22 ha; Figure O).
 - Permanent loss of up to 21 pine trees identified as high-quality Carnaby's cockatoo foraging and potential roosting habitat, which amounts to 24% of the pine trees identified by Terrestrial Ecosystems (2022)
 - Permanent loss of up to 3 marri trees identified as potential Carnaby's cockatoo breeding, high-quality foraging and potential roosting habitat, which amounts to 5% of the marri trees identified by Terrestrial Ecosystems (2022). None of the three marri trees have Carnaby's cockatoo nesting hollows
 - Permanent loss of up to 11 planted trees (non-native eucalypts) identified as low-quality Carnaby's cockatoo foraging and potential roosting habitat, which amounts to 1% of the planted trees (non-native eucalypts) identified by Terrestrial Ecosystems (2022)
 - Low risk of collision with turbines and transmission lines
- Migratory birds:
 - Low risk of collision with turbines and transmission lines.

Informed by the significance of impacts assessments undertaken for the identified MNES, the permanent loss of Carnaby's cockatoo foraging, potential breeding and potential roosting habitat is **likely to be a significant residual impact**. The remaining residual impacts to threatened flora, Banksia woodlands of the Swan Coastal Plain TEC, Carnaby's cockatoo and migratory birds are **unlikely to be of significance** (Appendix Y).

8.2 Proposed offset

An Offset Management Strategy (Surefire Environmental Pty Ltd 2025; Appendix AA) has been prepared to counterbalance the loss of significant Carnaby's cockatoo foraging, potential breeding and potential roosting habitat attributable to the Proposed Action, which are not able to be otherwise avoided or mitigated onsite.

Development of the proposed offset has been informed at all stages by the EPBC Act Environmental Offsets Policy (DSEWPac 2012), which identifies that the use of offsets to compensate for adverse impacts to

ecological values may be appropriate where there is a significant residual impact on a protected matter. Suitable offsets must:

- Deliver an overall conservation outcome that improves or maintains the viability of the aspect of the environment that is protected by national environment law and affected by the proposed action.
- Be built around direct offsets but may include other compensatory measures.
- Be in proportion to the level of statutory protection that applies to the protected matter.
- Be of a size and scale proportionate to the residual impacts on the protected matter.
- Effectively account for and manage the risks of the offset not succeeding.
- Be additional to what is already required, determined by law or planning regulations or agreed to under other schemes or programs.
- Be efficient, effective, timely, transparent, scientifically robust and reasonable.
- Have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced.

A preferred offset site has been identified. Further detail around the offset site selection process and development of the proposed offset package is detailed in the Offset Management Strategy (Surefire Environmental Pty Ltd 2025).

To support ease of administration, monitoring and enforcement, the Proponent has developed a single offset package to address Commonwealth requirements under the EPBC Act, as well as anticipated state offset requirements pursuant to the EP Act (discussed in further detail in Table 26).

9 OTHER STATUTORY APPROVALS

9.1 Commonwealth

Statutory approvals required under Commonwealth legislation, in addition to those required under the EPBC Act, are summarised in the following subsections.

9.1.1 *Native Title Act 1993*

The *Native Title Act 1993* seeks to establish a framework for the protection and recognition of native title.

Following the South West Native Title Settlement between the Noongar people and Western Australian government on 13 April 2021 native title as defined in the *Native Title Act 1993* ceased to apply over the Project Area.

A fundamental component of the South West Native Title Settlement was the recognition of Noongar people as the Traditional Owners of the south west region of Western Australia, as enshrined in the *Noongar (Koorah, Nitja, Boordahwan) (Past, Present, Future) Recognition Act 2016*.

The Proponent recognises the Yued Noongar as the Traditional Owners of the Project Area.

9.1.2 *Aboriginal and Torres Strait Islander Heritage Protection Act 1984*

The *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* (ATSIHP Act) seeks to protect areas and objects that are of particular significance to Aboriginal and Torres Strait Islander peoples.

No areas or objects listed under the ATSIHP Act are located within the Project Area or are otherwise expected to be impacted by the Proposed Action.

9.1.3 *Civil Aviation Act 1988*

The *Civil Aviation Act 1988* seeks to establish a regulatory framework for maintaining, enhancing and promoting the safety of civil aviation, with particular emphasis on preventing aviation accidents and incidents.

Part 139 of the *Civil Aviation Safety Regulations 1998* requires that any object extending to a height of 100 m or more above local ground level must be notified to the Civil Aviation Safety Authority by the Proponent.

The Proponent has previously engaged with the Civil Aviation Safety Authority in the context of applying for its Development Approval under the *Planning and Development Act 2005*. Formal tall structures notification under Part 139 of the *Civil Aviation Safety Regulations 1998* is proposed to be undertaken closer to the commencement of construction.

9.2 Western Australia

Several approvals are required to be obtained for the Proposed Action under Western Australian legislation. A summary of Western Australian approval requirements and the current status of each approval is summarised in Table 24.

Table 24: Western Australia State approval requirements

Legislation	Approval requirement(s)	Current status (April 2025)	Discussion	Monitoring, enforcement and review procedures
<i>Aboriginal Heritage Act 1972</i>	Section 18	Granted	Section 18 consent granted on 19 December 2016.	Monitoring of ground disturbance activities by two members of the Yued Native Title Claim group (now Yued Aboriginal Corporation).
	Activities that may impact, or harm Aboriginal heritage sites.	Grant date: 19 December 2016	NB: ground disturbing works are no longer proposed within the heritage site (refer section 4.9)	Provision of written report to Registrar of Aboriginal Sites within 60 days of completion of the works.
<i>Biodiversity Conservation Act 2016</i>	Section 40	To be obtained	The BC Act recognise that activities involving the taking of flora or fauna (other than threatened species) and the disturbing of fauna (including threatened species) that are approved under the EP Act do not require further approval under the BC Act, if they are undertaken in accordance with any biodiversity conservation conditions that are applied to an authorisation. These activities include clearing of native vegetation that does not involve the commission of an offence under the EP Act (i.e. clearing is either exempt or done under the authority of a clearing permit).	To be confirmed following determination of required approval.
	Taking, disturbing, supplying, possessing, dealing, importing or exporting of any native flora and fauna.	Timing: Prior to collection of any threatened fauna (including carcasses)	An approval (licence) will be required for the taking of any threatened fauna, including any injured threatened fauna or carcasses identified as a result of incidental finds or bird and bat monitoring surveys.	
			An approval (licence) is not anticipated to be required regarding threatened flora, as threatened flora is not proposed to be taken or disturbed during the Proposed Action.	
<i>Building Act 2011</i>	Building Permit	To be obtained (if required)	A Building Permit may be required for some components of the Proposed Action.	To be confirmed following determination of relevant approval (if required).
		Prior to the commencement of any 'building work'	This approval is proposed to be acquired by the Proponent's civil contractor following the determination of all Federal and State planning approvals, if required.	
<i>Bush Fires Act 1954</i>	Section 22C and 25A	To be obtained (if required)	An exemption must be obtained from the Department of Fire and Emergency Services for any works which could cause or are likely to cause fire in the open air during a Total Fire Ban or Restricted and Prohibited Burning Times. While unlikely, such works may be required during construction or operation of the Proposed Action.	To be confirmed following determination of relevant approval (if required).
	Exemptions (Total Fire Ban / Restricted and Prohibited Burning Times)	Timing: Prior to the commencement of any works which could cause or are likely to cause fire in the open air during a Total Fire Ban or Restricted and Prohibited Burning Times		
<i>Conservation and Land Management Act 1984</i>	Regulation 4 Authority	To be obtained (if required)	Works within Lot 4134 on Deposited Plan 240347 (Crown Reserve 41986) may require an authorisation under Regulation 4 of the <i>Conservation and Land Management Regulations 2002</i> as the land is listed under section 5(1)(ca) of the <i>Conservation and Land Management Act 1984</i> .	To be confirmed following determination of relevant approval (if required).
	Conservation and Land Management Regulations 2002	Timing: Prior to the commencement of works within Lot 4134 on Plan 240347 (if required)	The Proponent is current liaising with DBCA and DPLH around the requirement for this approval in light of the final form of tenure and other approvals pertaining to the Proposed Action.	
<i>Dampier to Bunbury Pipeline Act 1997</i>	Section 41	To be obtained	Required for all construction works crossing the Dampier to Bunbury Pipeline Corridor.	To be confirmed following determination of required approval.
	Approval of works that are not gas pipeline related activities within the Dampier to Bunbury Natural Gas Pipeline Corridor	Timing: Prior to the commencement of works within the Dampier to Bunbury Natural Gas Pipeline Corridor.	As approvals have a validity period of 6 months from grant, approval is proposed to be sought closer to the commencement of works in the areas concerned.	
<i>Dangerous Goods Safety Act 2004</i>	Dangerous Goods Safety (General) Regulations 2007	To be obtained	Dangerous goods may be required to be stored, handled or transported as part of the Proposed Action.	To be confirmed following determination of relevant approval (if required).
	Dangerous Goods Safety (Storage and Handling of Non-explosives) Regulations 2007	Timing: Prior to the transport, handling or storage of dangerous goods	Relevant approvals under the <i>Dangerous Goods Safety Act 2004</i> will be obtained prior to the storage, handling or transportation of dangerous goods.	
	Dangerous Goods Safety (Road and Rail Transport of Non-Explosives) Regulations 2007			
	Dangerous Goods Safety (Explosives) Regulations 2007			

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Legislation	Approval requirement(s)	Current status (April 2025)	Discussion	Monitoring, enforcement and review procedures
Electricity Industry Act 2004	Generator Performance Standards	Under Assessment	Chapter 3A of the WEM Rules details the requirements for electricity generators to connect new generation assets to the WEM. The process of network modelling, obtaining an access offer and Generator Performance Standards assessment and approval is a tripartite effort between the Proponent, network operator (Western Power) and AEMO.	To be confirmed following determination of relevant approval.
	Electricity Industry (Wholesale Electricity Market) Regulations 2004	Timing: prior to connection to the WEM		
	Wholesale Electricity Market (WEM) Rules (10 March 2025)		The Proponent is currently actively engaged in the GPS submission and assessment process.	
Environmental Protection Act 1986	Part IV	Not Required	The Proposed Action was referred to the Environmental Protection Authority (EPA) in 2011 and was ultimately determined by the EPA on 10 October 2011 not to require assessment.	N/A
	Environmental Impact Assessment		Subsequent engagement with regulatory authorities in 2023 and 2024 confirmed Part V (Native Vegetation Clearing Permit) of the EP Act to be the appropriate assessment pathway for the Proposed Action.	
	Part V	Under Assessment	An application was lodged with DWER in November 2023 and was publicly advertised between 20 January and 9 February 2024.	To be confirmed following determination of relevant approval.
	Native Vegetation Clearing Permit	Timing: Prior to any clearance of native vegetation	Assessment of the application is currently on hold to facilitate alignment between State and Federal offset requirements.	
	Part V (Environmental Protection Regulations 1987)	To be obtained (if required)	A works approval and licence may ⁸ be required for on-site concrete batching.	To be confirmed following determination of relevant approval (if required).
	Works Approval and Licence	Timing: Prior to the commencement of concrete batching	This approval is proposed to be acquired by the civil contractor closer to the commencement of concrete batching, if required.	
Land Administration Act 1997	Section 91 Licence / Lease / Easement	To be obtained	An easement, section 91 licence and/or lease will be required to facilitate construction and operation of the transmission line over Lot 4134 on Deposited Plan 240347 (Crown Reserve 41986) and Lot 3901 on Deposited Plan 209568 (Crown Reserve 27216)	To be confirmed following determination of required approval.
		Timing to the commencement of construction in Lot 4134 on Deposited Plan 240347 (Crown Reserve 41986) and Lot 3901 on Deposited Plan 209568 (Crown Reserve 27216)	The Proponent is currently engaged in negotiations with Western Power, DPLH and DBCA to finalise the proposed form of tenure.	
Local Government Act 1999	Extractive Industries Licence	Not Required	Approval is required from the Shire of Dandaragan to undertake an extractive industry, including borrow pits for concrete batching.	N/A
	Shire of Dandaragan - Extractive Industries Local Law 2019		Following engagement with the Shire of Dandaragan in 2022, it was confirmed the proposed borrow pits do not require approval under the Shire of Dandaragan – Extractive Industries Local Law 2019 as all extracted material is proposed to be used on the wind farm site.	
Main Roads Act 1930	Approval to Undertake Works within the Main Roads Reserve	To be obtained	Construction of the proposed transmission line across Brand Highway and utilisation of accesses off the Brand Highway for construction and operation require the approval of Main Roads Western Australia.	To be confirmed following determination of relevant approval.
		Timing: Prior to the commencement of construction of the transmission line	The Proponent commenced engagement with Main Roads Western Australia in 2023 and intends to formally seek this approval closer to the commencement of construction. The approval cannot be applied for until a Native Vegetation Clearing Permit (see above) has first been obtained.	
Planning and Development Act 2005	Development Approval	Granted	Development Approval first granted in 2012 and subsequently amended in 2016, 2019 and 2024.	Subject to conditions (Appendix X)
		Grant date: 22 February 2024 (subject to amendment application)*	* The Proponent has recently sought an amendment to the Development Approval to increase the height of the wind turbines from 180m up to a maximum of 220m. Following further design development in response to wind loadings and advice from the turbine manufacturer the final height of the turbines is expected to be approximately 206m. This height has been used for assessment purposes as part of this Preliminary Documentation.	NB: minor amendments to the conditions are anticipated should the tip height modification be approved.

⁸ NB: An exemption applies pursuant to Schedule 1 of the *Environmental Protection Regulations 1987* if cement products or concrete manufactured are used on the same places or premises. This exemption may apply across the Waddi Wind Farm site (subject to confirmation with the relevant authority).

REPORT

Legislation	Approval requirement(s)	Current status (April 2025)	Discussion	Monitoring, enforcement and review procedures
	Western Australian Planning Commission (WAPC) Approval (for leases / licenses exceeding 20 years)	Granted	Granted in relation to Lot 3903 on Deposited Plan 209569, Lot 101 on Diagram 72336, Lot 3 on Deposited Plan 8424, Lot 3805 on Deposited Plan 209083, Lot 3897 on Deposited Plan 209569, Lot 3846 on Deposited Plan 209083, Lot 3899 on Deposited Plan 209567 and Lot 2 on Deposited Plan 8424.	None specified in approval.
		To be obtained	WAPC approval will be required prior to commencement of the lease pertaining to Lot 105 on Deposited Plan 59027.	To be confirmed following determination of relevant approval.
		Timing: prior to the commencement of any lease or licence exceeding 20 years		
		Not Required	WAPC approval is not anticipated for the remaining lots comprising the Project Area (Lot 3901 on Plan 209568 (Crown Reserve 27216), Lot 4134 on Plan 240347 (Crown Reserve 41986), Lot 3 on Plan 408189 and Lot 2 on Plan 408189) due the proposed form of tenure or proposed tenure duration not meeting the requirements for WAPC approval.	N/A
Rights in Water and Irrigation Act 1914	Take/use of surface/groundwater or interference/obstruction of a watercourse	Not Required	All water required to service the Proposed Action is proposed to be obtained off-site. No new take/use of surface/ground water nor any interference or obstruction of a proclaimed watercourse is proposed.	N/A
Road Traffic (Vehicles) Act 2012	Oversize Overmass (OSOM) Traffic Management Plan	To be obtained	Transport of the wind turbine blades from the port to the Project Area is expected to require approval from Main Roads Western Australia Heavy Vehicle Services Branch in the form of an OSOM Traffic Management Plan.	To be confirmed following determination of relevant approval.
		Timing: Prior to the commencement of any high-risk OSOM vehicle movements	The Proponent is currently engaging with the Main Roads Western Australia Heavy Vehicles Services Branch in relation to preparation of the OSOM Traffic Management Plan.	

10 SOCIAL AND ECONOMICS

10.1 Stakeholder consultation

The Proponent is committed to the communities in which it operates, with stakeholder engagement underpinned by four key principles (Table 25).

Table 25: Principles of engagement

Principle	Consideration
Do what we say we'll do (authenticity)	- Deliver on commitments made to the community - Provide periodic targeted feedback to the community on key achievements and deliverables
Be an effective communicator (relationship building)	- Talk with, not at - Be inclusive in communication and consider others' points of view - Use transparent, simple and straightforward communication. Do not go under the radar. Be available to the community, including in person and be easily contactable - Provide periodic, factual information that is easy to understand and widely available to interested stakeholders
Behave appropriately (mutual respect)	- Behave in accordance with the Proponent's values - Demonstrate empathy - Be sensitive and respectful and acknowledge community concerns
Monitor continuously (appropriateness)	- Plan and implement the engagement programme - Monitor and review the effectiveness and outcomes - Revise the engagement strategy if necessary

10.1.1 Consultation undertaken to date

Contact with stakeholders began early in the life cycle of the Proposed Action and will continue to the end of the life cycle after decommissioning. The Proponent strives to ensure genuine stakeholder engagement occurs throughout all aspects of the Proposed Action and that staff are proactive in engaging with stakeholders, including the community and Aboriginal and Torres Strait Islander people(s).

A dedicated website has been established for the Waddi Wind Farm, providing information about the Proposed Action and opportunities for the community to engage: www.waddiwindfarm.com.au. The website includes detailed layout maps, factsheets about the Proposed Action, copies of relevant approvals, environmental assessments, and contact details for further enquiries.

The first Waddi Wind Farm community newsletter was published in May 2017, providing an overview of the Proposed Action's key elements. Since then, newsletter updates have been shared in May 2021, November 2022, February 2023, December 2023 December 2024 and March 2025. Members of the public can subscribe to the mailing list on the website or by contacting the 1800 number (1800 WE TILT).

Community information sessions / open days were held in 2016, 2022, 2023 and 2024. Individual meetings with local residents, government stakeholders and community groups are ongoing.

Overall community feedback towards the Proposed Action has been positive, with particular interest shown in potential employment and contracting opportunities.

Consultation with the following key state government agencies has also taken place from 2011 to 2025:

- Western Power
- Shire of Dandaragan
- Main Roads Western Australia
- Department of Biodiversity, Conservation and Attractions
- Department of Planning, Lands and Heritage
- Department of Jobs, Tourism, Science and Innovation
- Department of Water and Environmental Regulation

- Environmental Protection Authority.

10.1.2 Future consultation to be undertaken

Stakeholder engagement will remain ongoing and be guided throughout the Proposed Action's construction, operation and decommissioning phases, by a 'live' Stakeholder and Community Engagement Plan. Stakeholders will continue to be engaged on an ongoing basis through engagement tools such as newsletters, letters, emails, face-to-face meetings and other activities.

10.1.3 Aboriginal consultation

The Proponent is committed to working with local Aboriginal and Torres Strait Islander people(s) and communities, building trust and making a material difference to community wellbeing.

Preliminary consultation with Yued traditional owners commenced in 2008 and is now primarily led through the Yued Aboriginal Corporation with support from SWALSC.

Ethnographic surveys of the Project Area were undertaken in conjunction with Yued representatives in 2012, 2016, 2022 and 2023. The Proponent and the Yued Aboriginal Corporation have entered into a co-designed CHMP, replacing a CHMP originally entered into 2016, to govern construction of the Proposed Action, potential impacts to Moodjar trees, and accidental discoveries of Aboriginal cultural heritage sites or places. The co-designed CHMP includes:

- Requirements for cultural heritage inductions for all site personnel
- Identification, mapping and avoidance (where possible) of Moodjar trees (*Nuytsia floribunda*) of significance to the Yued Noongar people
- Opportunities for Yued people to seek employment and contracting roles
- Ongoing monitoring and reporting obligations.

The Proponent is currently working with the Yued Aboriginal Corporation to develop a Yued Partnership Fund to help support Yued Noongar aspirations across the life of the Proposed Action. A site visit has also been tentatively scheduled for May/June 2025.

10.2 Economic cost and benefits

10.2.1 Economic context

The Proposed Action is in the Shire of Dandaragan. The Shire's economy is relatively small and focused on the traditional industries of beef cattle, sheep, rock lobster, broadacre farming as well as tourism and mining. The Shire's Gross Regional Product was \$361 million in 2018–2019 and had grown at an average rate of 1.5% per annum over the preceding decade, below the Western Australian average of 3.5% (Shire of Dandaragan 2020).

The Shire has a low level of unemployment and high employment self-sufficiency levels, with an aging population and average population growth of 0.2% per annum over the decade to 2019 (Shire of Dandaragan 2020).

The Shire of Dandaragan's 'Envision 2029: Economic and Tourism Development Strategy' highlights the need for jobs growth and new investment opportunities in the Shire. The plan identifies the area's strong renewable energy potential as a target area for future long-term economic development (Shire of Dandaragan 2020).

10.2.2 Economic costs

The Proponent is currently finalising the terms of agreements for supply and install, balance of plant, grid connection and ancillary services for the Waddi Wind Farm. Suppliers have been chosen via a competitive tender process and have extensive experience in the renewable energy and construction industries.

The Proposed Action is expected to involve an investment of approximately \$320 million, including an estimated spend of over \$3.5 million in community benefits over its life. Discussions remain ongoing between

the Proponent and its suppliers, with cost estimates subject to continued negotiations and fluctuations in market and economic conditions.

10.2.3 Economic and public benefits

The Proposed Action is expected to provide a range of economic and social benefits to the region that align with vision of the Shire of Dandaragan's 'Envision 2029: Economic and Tourism Development Strategy (Shire of Dandaragan 2020)', as well as State and Federal emissions reduction targets under the Paris Agreement and *Climate Change Act 2022*. The Proposed Action will generate enough clean energy to power more than 68,000 homes per year, resulting in 286,000 tonnes of carbon emissions avoided annually – the equivalent of removing approximately 120,000 cars from the roads each year. Emissions associated with the construction, operation and decommissioning of the turbines are expected to be offset within the first 6.5 months of operation (Vestas 2023).

The Proposed Action will provide a direct economic benefits to host landholders by providing an additional and secure income stream, enabling landowners to diversify their land use and insure against market downturns.

The Proponent has committed to sharing the benefits of the Proposed Action with the broader local community. In addition to employment opportunities, a tailored Benefit Sharing Plan is being prepared for the Proposed Action, 25% of which will be sequestered for development of a Yued Partnership Fund. The Proponent prides itself on designing bespoke Benefit Sharing Plans that fit the specific needs of the local community in which the Proposed Action is situated. The objectives of the Benefit Sharing Plan are to:

- Ensure the local community directly benefits from the Proposed Action
- Drive broader public benefits and economic development that address the needs of the region
- Build on strategic opportunities to drive local innovation
- Create a legacy beyond the immediate benefits of the Proposed Action.

The Benefit Sharing Plan is being developed in consultation with the Yued Aboriginal Corporation, Shire of Dandaragan, local landowners and the wider community. While development is ongoing, the Proponent has continued to engage in benefit sharing initiatives, with projects over the past 12 months including:

- **Amity Health (Moora) (\$2,450):** Amity Health secured funding to provide healthy meals and kitchen supplies for participants completing their Certificate III Civil Construction Plant Operations.
- **Wolba Wolba Heritage Site Management Committee: Wheatbelt Ladies Lunch (\$1,000):** this committee is dedicated to connecting and inspiring women in Wheatbelt region while showcasing the Shire of Dandaragan. 50% of funds raised from the Wheatbelt Ladies Lunch have been directed to the Magnolia Women's Centre, which offers essential support services including education on domestic and family violence, goal setting, and safety planning. The remaining funds benefit Aggie's Cottage, a non-profit dedicated to preserving the historical significance of this local landmark. By featuring local produce, Aggie's Cottage boosts the local economy and highlight's the region's agricultural heritage.
- **Dandaragan Management Committee (\$3,600):** this committee secured funding for custom-built storage solutions for changerooms used by various local groups, including Dandaragan Primary School, Dandaragan Repertory, Dandaragan Playgroup and Dandaragan Cricket, Football, Netball and Hockey sporting teams.
- **Dandaragan Primary School (\$5,500):** Dandaragan Primary School secured funding to create a concrete base for an outdoor tennis table, which their Chaplain will use for one-on-one time with students who need extra support.

In 2020, the Proponent won the Clean Energy Council's Community Engagement Award for the Dundonnell Wind Farm Benefit Sharing Plan. Benefit sharing initiatives at other sites associated with the Proponent and related bodies corporate have included school and training scholarships, revegetation programmes, support for sports clubs, emergency services, community groups, regional events and tourism, mental wellbeing programmes for students, safe housing for vulnerable women and the provision of solar power for rural communities.

10.2.4 Employment benefits

The Proposed Action is expected to generate local employment during both the construction and operational phases. During the construction phase, the Proposed Action is expected to result in the creation of approximately 150 full-time positions. Approximately six full-time positions will be required during operation for the duration of its predicted 30-year lifespan.

The Proposed Action will also inject funds into the local community through the use of local goods and services. Typical goods and services likely to be sourced locally during construction and operations include accommodation, engineering, freight services, construction materials and equipment, local labour, technical contractors, earthworks services, fencing and landscaping.

The Proponent is committed to employing local people and buying local wherever the capabilities fit the needs of a project. A Goods and Services Register is linked to the Waddi Wind Farm website, enabling the Proponent and its contractors to build new working relationships with local industry partners. A 'Meet the Contractor' open day was held on Wednesday 31 January 2024 at the Dandaragan Community Recreation Club and was well attended by local businesspeople. Engagement with local industry stakeholders is planned to continue throughout the construction and operational phases.

The Proposed Action is anticipated to contribute over \$1 million per annum to the local community through payments to involved landholders, permanent staff, and community fund contributions. It will assist local farmers by providing a drought-proofing and post-retirement income stream.

11 ECOLOGICALLY SUSTAINABLE DEVELOPMENT

Section 3A of the EPBC Act defines the principles of Ecologically Sustainable Development (ESD):

- a. decision making processes should effectively integrate both long term and short term economic, environmental, social and equitable considerations
- b. if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation
- c. the principal of intergenerational equity – that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations
- d. the conservation of biological diversity and ecological integrity should be a fundamental consideration in decision making
- e. improved valuation, pricing and incentive mechanism should be promoted

Table 26 identifies how these five ESD principles have been considered by the wind farm.

Table 26: Principles of ESD

Principle	Consideration
Decision making processes should effectively integrate both long term and short term economic, environmental, social and equitable considerations	Project planning and revisions have been ongoing for over 17 years to enable comprehensive engagement with landholders, the community and Aboriginal people(s). Over this time, environmental impacts have been quantified and undergone design revisions in response to environmental constraints, ensuring that values are protected to the greatest extent possible through development and into the future. Environmental The Proposed Action is anticipated to have the following environmental benefits: • Generate enough combined renewable energy to power 68,000 homes per year. • Result in a reduction of 286,000 tonnes of carbon emissions by offsetting traditional (fossil fuel-derived) power generation. • Contribute towards the achievement of Western Australia and Commonwealth renewable energy and emissions reduction targets. • Generate local employment during both the construction and operational phases. • Contribute over \$1 million per annum to the local community through landowner payments, direct employment, use of local goods, services and community benefit scheme contributions. • Offset environmental impacts where they cannot be avoided to deliver nature positive outcomes. • Provide additional firebreaks and improved access roads for firefighting. • Deliver additional energy supply and enhance energy security to help meet the growing demands in Western Australia. The ecological values of the Project Area have been subject to extensive investigation by site-specific fauna and flora surveys and assessments conducted between 2008 and 2025. The Proponent acknowledges that there will be environmental impacts arising from the wind farm, however it is considered that any short-term loss can be appropriately mitigated at the point of impact and over the medium to long-term. The Proposed Action has been designed to ensure infrastructure avoids remnant vegetation wherever possible to reduce impacts. Post-construction rehabilitation, ongoing weed and pest animal management, as well as habitat retention, will benefit the environment in both the short and longer term, as will the provision of a high-quality environmental offset plan. Economic A large, skilled, regional workforce will be utilised during construction and local contractors / goods and services will be sourced during operation (where available). The Proposed Action is also anticipated to have the following employment and economic benefits: • Employ over 150 people during construction and approximately six full-time staff during its predicted 30-year lifespan. All of the Proponent's projects have resulted in significant local employment. The Proponent is committed to maximising local employment in their future projects

Principle	Consideration
	- Provide opportunities for local businesses. Typical goods and services likely to be sourced locally during construction and operations include accommodation, engineering, freight services, construction materials and equipment, local labour, technical contractors, earthworks services, fencing and landscaping - The Proposed Action will contribute over \$1 million per annum to the local community through payments to involved landholders, permanent staff, and community fund contributions. It will assist local farmers by providing a drought-proofing and post-retirement income stream. Social Contact with stakeholders began early in the Proposed Action's life cycle and will continue to the end of the life cycle during decommissioning. The Proponent strives to ensure stakeholder engagement occurs throughout all aspects of the Proposed Action's life cycle and that staff are proactive in engaging with all stakeholders. The Proponent has committed to sharing the benefits of the Proposed Action with the broader local community. In addition to the employment opportunities outlined in Section 10.2, a tailored Benefit Sharing Plan is being prepared for the Proposed Action. In addition, the Proposed Action will generate additional energy supply and enhance energy security to help meet the growing demands in Western Australia, while also contributing to downwards pressure on electricity prices. Equity The Proponent will preference local employment and procurement to the greatest extent possible, to provide fair access to employment and economic opportunities. During the construction phase, the Proposed Action is expected to result in the creation of approximately 150 full-time positions. Approximately six full-time positions will be required during operation for the duration of its predicted 30-year lifespan. The Proposed Action will also inject funds into the local community through the use of local goods and services. Typical goods and services likely to be sourced locally during construction and operations include accommodation, engineering, freight services, construction materials and equipment, local labour, technical contractors, earthworks services, fencing and landscaping. The disposal, recycling or repurposing of some wind farm components/ infrastructure is a potential impact; however, this is an evolving field of research. The Proponent will continue to be guided by best evidence when it comes time to remove/upgrade its infrastructure
If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation	Climate change poses a significant threat of serious and irreversible environmental damage. The Proposed Action will result in a reduction of 286,000 tonnes of carbon emissions per annum by offsetting traditional (fossil fuel-derived) power generation, contributing towards the achievement of Western Australian and Commonwealth emissions reduction targets. The environmental values of the Project Area have been subject to extensive investigation by site-specific fauna and flora surveys and assessments conducted between 2008 and 2025. Subsequently, appropriate mitigation measures have been identified for all confirmed and potential species, and their habitat, as well as any overall environmental impacts of the Proposed Action. Proposed avoidance and mitigation measures are detailed in Section 7 and residual impacts and proposed offsets in Section 8.
The principal of intergenerational equity – that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations	The principle of intergenerational equity requires the present generation to ensure that the health and diversity of the environment are maintained or enhanced for the benefit of future generations. Renewable energy generation facilitates intergenerational equity through emissions reduction, contributing to mitigation of the adverse impacts of climate change. Wind energy is a natural resource that can be used in perpetuity and its use today will not deplete the resource for use by future generations. Its ongoing use is also not dependent on, or at the expense of, nature. Wind farms are compatible with ongoing agricultural use of land, thereby protecting its productivity for future use. Land restoration following decommissioning of a wind farm is straightforward; the land area impacted is minimal. No contamination requires rectification (such is commonly associated with mining and other traditional, fossil-fuel derived power generation) and minimal land reformation works are necessary.
The conservation of biological diversity and ecological integrity should be a fundamental consideration in decision making	Refinement of the wind farm design has occurred following detailed and iterative ecological investigations, with the aim of avoiding impacts to biodiversity. Key refinements directed at the conservation of biological diversity and ecological integrity include: - Removal of 39 wind turbines (from 57 to 18) - Revisions to the transmission line alignment to maximise utilisation of existing access tracks - Revisions to the Indicative Works area and Indicative Disturbance area

Principle	Consideration
	• Raising the proposed height of the turbines, to reduce the risk posed to the Carnaby's cockatoo species • Changes to the Waddi Road access location to avoid direct impacts to 10 star sun-orchid individuals that were possibly located within the previous Native Vegetation Clearing Area (accounting for GPS accuracy levels) The Proponent has a commitment to deliver to net positive outcomes for the area, particularly over the long-term.
Improved valuation, pricing and incentive mechanisms should be promoted	Renewable energy development is supported at the regional, state and federal level. The Western Australian and Australian governments have established goals (targets) for renewable energy generation and provided incentives (financial and regulatory) for projects in the sector. This enables projects such as the Proposed Action to be undertaken in a cost-effective way that is also responsive to environmental constraints. The Proposed Action is expected to involve an investment of approximately \$320 million in costs, including an estimated spend of over \$3.5 million in community benefits over its life.

12 NATIONAL AND INTERNATIONAL OBLIGATIONS

Table 27 discusses the relevant obligations under the listed national legislation / guidance and international conventions / agreements how the Proposed Action will meet the obligations.

Table 27: Proposed Action obligations under relevant conventions

National / international obligations	Australia’s obligations	Proposed Action compliance
Environment Protection Biodiversity Conservation Act 1999	The objectives of the EPBC Act are to: • Provide for the protection of the environment, especially those aspects of the environment that are matters of national environmental significance. • Promote ecologically sustainable development through the conservation and ecologically sustainable use of natural resources. • Promote the conservation of biodiversity. • Provide for the protection and conservation of heritage. • Promote a co-operative approach to the protection and management of the environment involving governments, the community, land-holders and Indigenous peoples. • Assist in the co-operative implementation of Australia’s international environmental responsibilities. • Recognise the role of Indigenous people in the conservation and ecologically sustainable use of Australia’s biodiversity. • Promote the use of Indigenous peoples’ knowledge of biodiversity with the involvement of, and in co-operation with, the owners of the knowledge.	On 13 November 2023, a delegate of the Minister for the Environment and Water decided that the Proposed Action is likely to have a significant impact on matters protected under the EPBC Act, specifically threatened species and communities and migratory birds, and hence a controlled action. It was determined that the Proposed Action would be assessed by Preliminary Documentation. On 22 December 2023, DCCEEW requested additional information to assess the relevant impacts of the Proposed Action. The threatened species, threatened community and migratory birds identified by DCCEEW that could potentially be impacted by the Proposed Action, because of habitat clearance, habitat fragmentation, and through turbine and transmission line collision and barotrauma, and for which potential impacts have accordingly been assessed for significance against relevant guidelines, are: • Listed threatened species and community: – Carnaby’s cockatoo (<i>Zanda latirostris</i>) (Endangered) – Curlew sandpiper (<i>Calidris ferruginea</i>) Critically Endangered – Sharp-tailed sandpiper (<i>Calidris acuminata</i>) (Vulnerable) – Banksia woodlands of the Swan Coastal Plain TEC (Endangered) – Star sun-orchid (<i>Thelymitra stellata</i>) (Endangered) – Dwarf green kangaroo paw (<i>Anigozanthos viridis</i> subsp. <i>terraspectans</i>) (Vulnerable) – Lesueur hakea (<i>Hakea megalosperma</i>) (Vulnerable) – Sandplain duck orchid (<i>Caleana dixonii</i>) (Endangered) – Glossy-leafed hammer orchid (<i>Drakaea elastica</i>) (Endangered) • Migratory bird species: – Curlew sandpiper (<i>Calidris ferruginea</i>) (Migratory) – Fork-tailed swift (<i>Apus pacificus</i>) (Migratory) – Sharp-tailed sandpiper (<i>Calidris acuminata</i>) (Migratory) – Pectoral sandpiper (<i>Calidris melanotos</i>) (Migratory) – Common sandpiper (<i>Actitis hypoleucos</i>) (Migratory). The Proponent prepared the Preliminary Documentation to address the additional information required by DCCEEW for assessment under the EPBC Act, which was submitted to DCCEEW in April 2024. On 28 May 2024, DCCEEW requested additional information to assess the impacts of the Proposed Action pursuant to Section 95A(2) of the EPBC Act (Appendix A). The Proponent undertook ecological surveys and prepared this amended Preliminary Documentation to address the additional information required by DCCEEW for assessment under the EPBC Act. The Proposed Action will result in permanent loss of 5.33 ha of native vegetation identified as high-quality Carnaby’s cockatoo foraging habitat, which amounts to 0.013% of the identified potential Carnaby’s cockatoo foraging habitat within 12 km of the Project Area (40,284.77 ha; Figure O). This will not diminish local or regional stocks of habitat available for this species and is unlikely to materially alter existing flock movement patterns. The permanent loss of significant Carnaby’s cockatoo habitat is proposed to be permanently offset. Other identified potential impacts to Carnaby’s cockatoo, migratory birds, threatened flora and Banksia woodlands of the Swan Coastal Plain TEC are unlikely to be of significance. These other impacts are capable of being managed through the implementation of the measures outlined in Table 23.
EPBC Act policy statements, and guidelines	• Policy statements are policies and procedures that serve as guidance and should be applied consistently with the requirements of the EPBC Act. • Guidelines help to determine whether an action is likely to have a significant impact on a MNES listed under the EPBC Act.	The Proposed Action has demonstrated compliance with key DCCEEW policy statements and guidelines, including: • Matters of National Environment Significance: Significant Impact Guidelines 1.1 (Department of the Environment 2013) • EPBC Act Policy Statement 2.3 – Wind Farm Industry (DEWHA 2009) • EPBC Act Policy Statement 3.21—Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species (Commonwealth of Australia 2017) • Draft Survey Guidelines for Australia’s Threatened Orchids (Commonwealth of Australia 2013) • <i>Referral guideline for 3 WA threatened black cockatoo species</i> (DAWE 2022) • <i>Environment Protection Biodiversity Conservation Act 1999</i> Environmental Offsets Policy (DSEWPaC 2012) • Draft Onshore wind farm guidance - best practice approaches when seeking approval under Australia’s national environment law (DCCEEW 2024p) • Environmental Management Plan Guidelines (DCCEEW 2024r) • Guidelines for biological survey and mapped data (Department of the Environment and Energy (DEE) 2018) • Guide to providing maps and boundary data for EPBC Act projects (DAWE 2021).

National / international obligations	Australia's obligations	Proposed Action compliance
Matters of National Environment Significance: Significant Impact Guidelines 1.1 (Department of the Environment 2013)	- The purpose of these guidelines is to assist any person who proposes to take an action to decide whether they should submit a referral to DCCEEW for a decision by the Commonwealth Minister for Environment and Water on whether assessment and approval is required under the EPBC Act. Under the EPBC Act an action will require approval from the minister if the action has, will have, or is likely to have, a significant impact on a matter of national environmental significance - The Guidelines suggest the following considerations when deciding as to whether to refer an action to the Minister: - Are there any matters of national environmental significance located in the area of the Proposed Action? - Considering the Proposed Action at its broadest scope, is there potential for impacts on matters of national environmental significance? - Are there any proposed measures to avoid or reduce impacts on matters of national environmental significance? - Are any impacts of the Proposed Action on matters of national environmental significance likely to be significant impacts? - When considering whether an action is likely to have a significant impact on a matter of national environmental significance it is relevant to consider all adverse impacts which result from the action, including indirect and off-site impacts.	Significance of impacts assessments have been undertaken for MNES identified by the Commonwealth as part of the DCCEEW request for additional information in accordance with the Significant Impact Guidelines 1.1 (Department of the Environment 2013) as part of this Preliminary Documentation. The significance of impacts assessments has been provided in Appendix Y.
EPBC Act Policy Statement 2.3 – Wind Farm Industry (DEWHA 2009)	The purpose of this policy statement is to assist operators in the wind farm industry to decide whether Proposed Actions require referral under the EPBC Act.	The Proposed Action was referred to DCCEEW in August 2023.
EPBC Act Policy Statement 3.21—Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species (Commonwealth of Australia 2017)	The purpose of this policy statement is to assist proponents in avoiding, assessing and mitigating significant impacts on migratory shorebirds listed under the EPBC Act.	Significance of impacts assessments have been undertaken for the migratory shorebirds (curlew sandpiper, sharp-tailed sandpiper, pectoral sandpiper and common sandpiper) identified by the Commonwealth as part of the DCCEEW request for additional information. This was undertaken in accordance with the Significant Impact Guidelines 1.1 (Department of the Environment 2013) and informed by the EPBC Act Policy Statement 3.21 (Commonwealth of Australia 2017). The significance of impacts assessments has been provided in Appendix Y.
Referral guideline for 3 WA threatened black cockatoo species (DAWE 2022)	This guideline: - Provides advice on what actions are likely and unlikely to require referral under the EPBC Act because they could have a significant impact on black cockatoos - Provides details on the types of things that need to be considered when determining whether the proposal needs to be referred - Outlines information on habitat quality, survey expectations and standards for mitigating impacts, which could influence a decision on whether to refer an action.	- An assessment of whether development of the Proposed Action is likely to have a significant impact on Carnaby's cockatoo using the EPBC Act <i>Referral guideline for 3 WA threatened black cockatoo species</i> has been undertaken to supplement the significance impact assessment for this species using the Significant Impact Guidelines 1.1 (Department of the Environment 2013) as part of this Preliminary Documentation. The assessment using this guideline has been provided in Appendix Y. - Carnaby's cockatoo habitat within the Disturbance Area and Native Vegetation Clearing Area was subject to assessment between 2021 and 2022 by Terrestrial Ecosystems (2022) (Appendix H). All vegetation within the survey area (excluding planted crops, and paddocks cleared or left as fallow) was assessed using the foraging habitat categories as described in the DAWE (2022) referral guidelines.
Environment Protection Biodiversity Conservation Act 1999 Environmental Offsets Policy (DSEWPaC 2012)	The principles of this policy are to: - Ensure the efficient, effective, timely, transparent, proportionate, scientifically robust and reasonable use of offsets under the EPBC Act - Provide proponents, the community and other stakeholders with greater certainty and guidance on how offsets are determined and when they may be considered under the EPBC Act - Deliver improved environmental outcomes by consistently applying the policy - Outline the appropriate nature and scale of offsets and how they are determined - Provide guidance on acceptable delivery mechanisms for offsets.	An Offset Management Strategy (Surefire Environmental Pty Ltd 2025; Appendix AA) has been prepared to counterbalance the permanent loss of Carnaby's cockatoo habitat attributable to the Proposed Action. The Offset Management Strategy has been prepared to accord with the principles of the <i>Environment Protection Biodiversity Conservation Act 1999 Environmental Offsets Policy</i> (DSEWPaC 2012).
Environmental Management Plan Guidelines (DCCEEW 2024r)	- These guidelines provide general advice to stakeholders preparing environmental management plans for environmental impact assessments and approvals under the EPBC Act. - An environmental management plan should: - Be balanced, objective and concise - State any limitations that apply, or should apply, to the use of the information in the environmental management plan - Identify any matter in relation to which there is a significant lack of relevant information or a significant degree of uncertainty - Include adaptive management strategies for managing uncertainty - Be written in a way that is easily understood by other parties - Clearly present how conclusions about risks have been reached - Ensure that the person taking the action takes full responsibility for the content and commitments contained in the plan.	A draft Bird and Bat Management Plan (Appendix Z) has been prepared as part of this Preliminary Documentation to mitigate and manage potential impacts to Carnaby's cockatoo, migratory birds, state-listed and common local bird species associated with individual mortality from turbine and potentially transmission line collision; and potential changes to species utilisation of the Project Area. The draft Bird and Bat Management Plan has been prepared in accordance with these environmental management plan guidelines.
Draft Onshore wind farm guidance - best practice approaches when seeking approval under Australia's national environment law (DCCEEW 2024p)	This guidance outlines the requirements that are specific to impacted listed bird and bat species that should be included in a Bird and Bat Management Plan. A Bird and Bat Management Plan demonstrates how a proponent will monitor for and manage impacts of turbine strike to birds and bats. This is a risk from wind farms which may well be manageable with proper evidence and consideration.	A draft Bird and Bat Management Plan (Appendix Z) has been prepared as part of this Preliminary Documentation to mitigate and manage potential impacts to Carnaby's cockatoo, migratory birds, state-listed and common local bird species associated with individual mortality from turbine and potentially transmission line collision; and potential changes to species utilisation of the Project Area.

National / international obligations	Australia's obligations	Proposed Action compliance
Any recovery plan or threat abatement plan for the species	- Recovery Plans outline the recovery actions that are required to address those threatening processes most affecting the ongoing survival of threatened taxa or ecological communities and begin the recovery process. Recovery Plans delineate, justify and schedule management actions necessary to support the recovery of threatened species and ecological communities. - Threat abatement plans establish a national framework to guide and coordinate Australia's response to the impacts of threats on biodiversity. They identify the research, management and other actions needed to ensure the long-term survival of native species and ecological communities affected by key threatening process. - Plans are developed with the involvement and cooperation of a range of stakeholders, but individual stakeholders have not necessarily committed to undertaking specific actions. The attainment of objectives and the provision of funds may be subject to budgetary and other constraints affecting the parties involved. Proposed actions may be subject to modification over the life of the plan due to changes in knowledge.	As part of preparing this Preliminary Documentation, a review was undertaken to determine the recovery plans and / or threat abatement plans of relevance to the MNES identified by DCCEEW. The following recovery plan and threat abatement plans were identified: - Carnaby's Cockatoo (<i>Calyptorhynchus latirostris</i>) Recovery Plan (Department of Parks and Wildlife 2013) - Threat abatement plan for competition and land degradation by rabbits (DEE 2016c). - Threat abatement plan for predation by feral cats (Department of the Environment 2015b) - Glossy-leafed Hammer Orchid (<i>Drakaea elastica</i>) Recovery Plan (DEC 2009) - Threat abatement plan for disease in natural ecosystems caused by <i>Phytophthora cinnamomi</i> (DEE 2018b)
Carnaby's Cockatoo (<i>Calyptorhynchus latirostris</i>) Recovery Plan (Department of Parks and Wildlife 2013)	- Provides background information on Carnaby's cockatoo, threatening processes that affect this species, and identifies the recovery objective, success criteria and the actions required to progress towards the longer-term recovery of this species. - Defines habitat critical to survival for Carnaby's cockatoos as: - The eucalypt woodlands that provide nest hollows used for breeding, together with nearby vegetation that provides feeding, roosting and watering habitat that supports successful breeding - Woodland sites known to have supported breeding in the past and which could be used in the future, provided adequate nearby food and/or water resources are available or are re-established - In the non-breeding season, the vegetation that provides food resources as well as the sites for nearby watering and night-roosting that enable the cockatoos to effectively utilise the available food resources - Identifies six broad themes for recovery actions: a. Protect and manage important habitat b. Undertake regular monitoring c. Conduct research to inform management d. Manage other impacts e. Engage with the broader community - Undertake information and communication activities.	- The Project Area has been the subject of a significant body of site-specific ecological investigation spanning 17 years between 2009 and 2025 that has underpinned the characterisation and identification of values of relevance to Carnaby's cockatoo. - On-site investigations have been supplemented by subject matter expert advice from Murdoch University's Black Cockatoo Research team who provided a technical review of Carnaby's cockatoo night-roosting and flock movement behaviours in the localities of Cooljarloo, Cataby and Badgingarra using research data sourced between 2017 and 2022 to indicate generalised Carnaby's cockatoo flock movements in these areas (Section 5.3.2). - The Murdoch University research data correlates with the findings of the earlier fauna assessments, which identify that the movements of Carnaby's cockatoo occur along lowland woodland corridors within valleys. These areas contain large, consolidated extents of banksia woodland and proteaceous heath communities that meet foraging requirements of Carnaby's cockatoo. The Murdoch University data indicates a strong habitat preference for the consolidated vegetated extents containing foraging, roosting and breeding habitat which occur proximate to Brand Highway, when compared to the open agricultural paddocks proximate to the turbine locations of the Proposed Action, which also include small isolated patches of habitat (Section 5.3.2). - Recent monitoring data from proximate Dandaragan wind farms has also been sourced to provide further confirmatory evidence of regional flock movements and inform the collision risk likelihood rating presented by the Proposed Action to Carnaby's cockatoo. - The outcomes of these investigations have underpinned the impact assessments, proposed avoidance and mitigation measures, Offset Management Strategy (Surefire Environmental Pty Ltd 2025; Appendix AA) and draft Bird and Bat Management Plan (RPS 2025; Appendix Z) to identify and address potential impacts to Carnaby's cockatoo from the Proposed Action as part of this Preliminary Documentation
Threat abatement plan for competition and land degradation by rabbits (DEE 2016c)	- Provides background information on rabbits and identifies the objectives and the actions to minimise species impacts - Identifies the following key objectives: - Strategically manage rabbits at the landscape scale and suppress rabbit populations to densities below threshold levels in identified priority areas - Improve knowledge and understanding of the impact of rabbits and their interactions with other species and ecological processes - Improve the effectiveness of rabbit control programmes - Increase engagement of, and awareness by, the community of the impacts caused by rabbits, and the need for integrated control.	- The Proposed Action is not anticipated to materially alter the local Cooljarloo rabbit population. - Revegetation of any temporary access tracks after construction will need to consider seedling protection to avoid herbivory by rabbits.
Threat abatement plan for predation by feral cats (Department of the Environment 2015b)	Provides background information on feral cats and identifies measures for controlling cats including eradication, shooting, trapping, exclusion fencing, baiting, other uses of toxins, lures, other controls, biological controls, fertility control, habitat management and financial incentives.	- The Proposed Action is not anticipated to materially alter the local Cooljarloo cat population (if present). - During operation of the Proposed Action, bird carcasses may be a potential food source for any cats (if present) within the area. - Carcass management procedures may need to be developed if it is considered that bird carcasses are acting as a food source for cats.
Glossy-leafed Hammer Orchid (<i>Drakaea elastica</i>) Recovery Plan (Department of Environment and Conservation 2009)	- Provides background information on glossy-leafed hammer orchid, threatening processes that affect this species, and identifies the recovery objective and the actions required to progress towards the longer-term recovery of these species - Defines habitat critical to survival for glossy-leafed hammer orchid as: - Area of occupancy of important populations; areas of similar habitat surrounding important populations (i.e. low-lying areas of deep sand supporting banksia woodland or spearwood thicket)	This Preliminary Documentation has concluded that the glossy-leafed hammer orchid is likely to be locally absent from the Project Area (Section 5.4.6).

National / international obligations	Australia's obligations	Proposed Action compliance
	– Additional occurrences of similar habitat that may contain important populations of the species or be suitable sites for future translocations or other recovery actions intended to create important populations • Identifies the following recovery actions: a. Coordinate recovery actions b. Liaise with appropriate stakeholders c. Reduce impact of grazing on seed production d. Undertake hand-pollination e. Collect and store seed f. Monitor populations g. Obtain biological and ecological information h. Implement weed control i. Develop and implement a fire management strategy j. Develop and implement a <i>Phytophthora</i> strategy k. Conduct further surveys l. Develop and implement best practice protocols for translocations m. Promote awareness.	
Threat abatement plan for disease in natural ecosystems caused by <i>Phytophthora cinnamomi</i> (DEE 2018b)	• Provides background information on <i>Phytophthora cinnamomi</i> and identifies the objectives and the actions to minimise its impacts. • Identifies the following key objectives: a. Identify and prioritise for protection biodiversity assets that are, or may be impacted, by <i>Phytophthora cinnamomi</i> b. Protect priority biodiversity assets through reducing the spread and mitigating the impacts of <i>Phytophthora cinnamomic</i> c. Communication and training.	• Plant pathogens (e.g. <i>Phytophthora</i> dieback) have the potential to be introduced and spread within the Project Area during vegetation clearing, construction and operation. Where these works are adjacent to susceptible native vegetation (e.g. banksia woodlands, proteaceous heath), the introduction / spread of <i>Phytophthora</i> dieback has the potential to result in vegetation death. This has implications for Threatened flora species which may rely upon the habitat for survival, Carnaby's cockatoo that utilise these areas as foraging habitat and Banksia woodlands of the Swan Coastal Plain TEC which may form part of the adjacent vegetation assemblage • The potential for indirect impacts to occur to the adjoining vegetation (e.g. through introduction and spread of <i>Phytophthora</i> dieback or weeds, edge effects) will be managed through the implementation of the following general hygiene protocols: – Clean earth-moving machinery and vehicles of soil and vegetation prior to entering the Disturbance Area – Soil to be moved in dry conditions – No <i>Phytophthora</i> dieback infested or weed impacted soil, mulch, fill or other material is brought into the Disturbance Area – Movement of machines and other vehicles to be restricted to cleared access tracks and works area within the Disturbance Area • Prior to vegetation clearing / construction commencing a <i>Phytophthora</i> dieback survey of the Native Vegetation Clearing Area will be undertaken by a <i>Phytophthora</i> dieback specialist. The findings and recommendations of the <i>Phytophthora</i> dieback survey will inform the implementation of the proposed hygiene protocols. • With the implementation of the agreed hygiene protocols during vegetation clearing, construction and operation the risk presented by plant pathogens (e.g. <i>Phytophthora</i> dieback) is considered to be low.
The Bonn Convention	The Commonwealth Government has entered into several regional international agreements associated with the Convention on the Conservation of Migratory Species of Wild Animals (often referred to as the Bonn Convention), including bilateral migratory bird agreements with China (CAMBA), Japan (JAMBA) and the Republic of Korea (ROKAMBA); the Agreement on the Conservation of Albatrosses and Petrels; and the East Asian – Australasian Flyway Partnership. The Australian Government's Wildlife Conservation Plan for Migratory Shorebirds identifies research and management actions to protect migratory shorebirds in Australia. All 35 species covered by the plan are listed migratory species under the EPBC Act.	Under the laws and regulations of the EPBC Act, and this agreement, the Proposed Action will seek to avoid and mitigate potential impacts to MNES, including migratory species, giving effect to Australia's international environmental obligations. Species specific assessments have been provided as part of this Preliminary Documentation for the following migratory species: • Curlew sandpiper (<i>Calidris ferruginea</i>) (Migratory) • Fork-tailed swift (<i>Apus pacificus</i>) (Migratory) • Sharp-tailed sandpiper (<i>Calidris acuminata</i>) (Migratory) • Pectoral sandpiper (<i>Calidris melanotos</i>) (Migratory) • Common sandpiper (<i>Actitis hypoleucos</i>) (Migratory).
China-Australia Migratory Bird Agreement (CAMBA)	The protection of listed migratory birds and their environment through prohibiting the taking of migratory birds and their eggs, excluding specifically listed cases. Encourages the exchange of data and research, formulate joint research programmes and encourage the conservation of migratory birds, especially those species in danger of extinction.	Under the laws and regulation of the EPBC Act, and these agreements, the Proposed Action has sought to avoid and mitigate potential impacts to migratory birds and their habitat.
Japan-Australia Migratory Bird Agreement (JAMBA)	The protection of listed migratory birds and their environment through prohibiting the taking of migratory birds and their eggs, excluding specifically listed cases. Encourages the exchange of data and research, formulate joint research programmes and encourage the conservation of migratory bird species and subspecies of which are in danger of extinction.	

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National / international obligations	Australia's obligations	Proposed Action compliance
Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA)	The protection of listed migratory birds and their environment through prohibiting the taking of migratory birds and their eggs, excluding specifically listed cases. Encourages the exchange of data and research, formulate joint research programmes and encourage the conservation of migratory birds and encourage the formulation of joint programmes to raise awareness of migratory bird conservation.	
Any international agreement approved under subsection 209(4) of the EPBC Act	Subsection 209 relates to Listed Migratory Species: (4) The Minister may, by legislative instrument, approve an international agreement for the purposes of subsection (3) if satisfied it is an agreement relevant to the conservation of migratory species.	This Preliminary Documentation uses a Protected Matters Search Tool report, generated for the Proposed Action in February 2025 (DCCEEW 2205a; Appendix S), to ensure all listed migratory species have been identified and addressed.

13 CONCLUSION

The Proponent is seeking to construct and operate the Waddi Wind Farm, an 18 turbine renewable energy development, located approximately 12 km north-west of Dandaragan in Cooljarloo, Western Australia. The Proposed Action is anticipated to generate enough combined renewable energy to power 68,000 homes per year and result in a reduction of 286,000 tonnes of carbon emissions by offsetting traditional (fossil fuel-derived) power generation.

The Proponent is committed to ensuring the Proposed Action achieves the principles of ecologically sustainable development and has a strong track record in the development and operation of wind and solar energy facilities across Australia.

The Project Area has been the subject of a significant body of site-specific ecological investigations spanning 17 years between 2008 to 2025. These investigations have underpinned characterisation of the site's flora, fauna and vegetation values and the implementation of a mitigation hierarchy framework across all stages of project development, from prospecting through to finalisation.

All site-specific ecological investigations have been prepared in accordance with relevant standards, policies and other guidance material published by DCCEE (and its predecessors) as at the time of their preparation.

The assessment of potential impacts of the Proposed Action on MNES undertaken in this Preliminary Documentation has considered the results of all site-specific ecological investigations as well as published literature, conservation advice, databases and available spatial information. The Proposed Action has avoided impacts to MNES as far as practicable, with future infrastructure positioned within previously disturbed areas wherever possible.

Despite exhaustive efforts to avoid and mitigate impacts, the Proposed Action is expected to result in significant residual impacts to Carnaby's Black Cockatoo (*Zanda latirostris*) in the form of the permanent loss of foraging, potential breeding and potential roosting habitat. An Offset Management Strategy (Surefire Environmental Pty Ltd 2025; Appendix AA) has been prepared to compensate for these significant residual impacts.

Potential impacts to other MNES, including migratory bird species, threatened flora species and the Banksia woodlands of the Swan Coastal Plain TEC have been comprehensively assessed in the Preliminary Documentation are not expected to be significant.

14 PRELIMINARY DOCUMENTATION AUTHORS

The Preliminary Documentation was prepared by environmental consultants from RPS:

- Margaret McCormack (Senior Environmental Consultant) – Preliminary Documentation preparation
- Richard Storey (Graduate Environmental Consultant) - Preliminary Documentation preparation
- Clare Thatcher (Principal Geospatial Analyst) – figure preparation
- Giles Glasson (Practice Leader) – Preliminary Documentation preparation and review.

15 INFORMATION SOURCES

Table 28: Information sources for the Preliminary documentation

Reference (source and date)	Reliability	Uncertainties	Key assessment standards
AEMO. 2024. Integrated System Plan (ISP). Accessed December 2024 https://aemo.com.au/energy-systems/major-publications/integrated-system-plan-isp/2024-integrated-system-plan-isp	AEMO website	N/A	N/A
AEMO. 2025. About the Wholesale Electricity Market (WEM). Accessed April 2025 https://aemo.com.au/energy-systems/electricity/wholesale-electricity-market-wem/about-the-wholesale-electricity-market-wa-wem	AEMO website	N/A	N/A
APA. 2024a. Badgingarra Wind Farm. Accessed February 2024 https://www.apa.com.au/our-services/other-energy-services/wind-and-solar-farms/badgingarra-wind-farm/	APA website	N/A	N/A
APA. 2024b. Emu Downs Wind Farm. Accessed February 2024 https://www.apa.com.au/our-services/other-energy-services/wind-and-solar-farms/emu-downs-wind-farm/	APA website	N/A	N/A
APA. n.d. Badgingarra Wind Farm. Accessed December 2024 https://www.apa.com.au/493e3c/globalassets/our-services/other-energy-services/wind--solar-farms/badgingarra-wind-farm/badgingarra-wind-farm-poster-with-technical-specifications.pdf	APA website	N/A	N/A
Alinta Energy. 2022. Yandin Wind Farm Avian Fauna Monitoring Program. Unpublished report prepared for Alinta Energy.	Prepared by environmental consultant	None stated	- Yandin Wind Farm Avian Fauna Collision Monitoring Program - Onshore wind farms – Interim Guidance on Bird and Bat Management
Alinta Energy. 2024. Yandin Wind Farm Avian Fauna Monitoring Program. Unpublished report prepared for Alinta Energy.	Prepared by environmental consultant	None stated	- Yandin Wind Farm Avian Fauna Collision Monitoring Program - Onshore wind farms – Interim Guidance on Bird and Bat Management
Atlas of Living Australia. 2024a. <i>Aphelocephala leucopsis</i> (Gould, 1841). Accessed February 2024 https://bie.ala.org.au/species/https://biodiversity.org.au/afd/taxa/d2e67121-b3b9-4292-84f9-4f070a05b7d4#overview	Internet data source based on peer reviewed articles, state government and community records	N/A	N/A
Atlas of Living Australia. 2024b. <i>Pezoporus flaviventris</i> North, 1911. Accessed February 2024 https://bie.ala.org.au/species/https://biodiversity.org.au/afd/taxa/bfeb0f1a-5581-4034-ba30-e330fe233af6	Internet data source based on peer reviewed articles, state government and community records	N/A	N/A
Atlas of Living Australia. 2024c. <i>Dasyurus geoffroii</i> Gould, 1841. Accessed February 2024 https://bie.ala.org.au/species/https://biodiversity.org.au/afd/taxa/a2260672-36df-48be-8a9e-d85a77237ba5#overview	Internet data source based on peer reviewed articles, state government and community records	N/A	N/A
Atlas of Living Australia. 2025a. <i>Botaurus poiciloptilus</i> (Wagler, 1827). Accessed April 2025. https://bie.ala.org.au/species/https://biodiversity.org.au/afd/taxa/dba78701-cae9-4afb-a41a-6697c52c5e34 .	Internet data source based on peer reviewed articles, state government and community records	N/A	N/A
Atlas of Living Australia. 2025b. <i>Calyptorhynchus (Calyptorhynchus) banksii naso</i> Gould, 1837. Accessed April 2025. https://bie.ala.org.au/species/https://biodiversity.org.au/afd/taxa/ebb36e48-4e64-42c5-a74c-309cc1e12961#overview	Internet data source based on peer reviewed articles, state government and community records	N/A	N/A
Atlas of Living Australia. 2025c. <i>Bettongia penicillata ogilbyi</i> (Waterhouse, 1841). Accessed February 2025 https://bie.ala.org.au/species/https://biodiversity.org.au/afd/taxa/7af35797-7374-49bb-8fb2-c05ead3a9ef0#overview	Internet data source based on peer reviewed articles, state government and community records	N/A	N/A
Atlas of Living Australia. 2025d. Atlas of Living Australia occurrence download at https://doi.org/10.26197/ala.42f6154f-f884-4342-a061-c3b024aa28a8 . Accessed March 2025.	Internet data source based on peer reviewed articles, state government and community records	N/A	N/A
Australian Wind Energy Association. 2004. Fact sheet 8: Wind farms and bird and bat impacts. Australian wind energy association.	Commonwealth peak body agency	Peak body no longer available.	N/A
Baerwald, E.F., D'Amours, G.H., Klug, B.J. and Barclay, R.M.R. 2008. Barotrauma is a significant cause of bat fatalities at wind turbines. Current Biology, Volume 18, Issue 16.	Peer reviewed journal article	N/A	N/A

Reference (source and date)	Reliability	Uncertainties	Key assessment standards
Bamford Consulting Ecologists. 2025. Carnaby’s Black-Cockatoo and Fork-tailed Swift utilisation survey report. Unpublished report prepared for RPS AAP Consulting Pty Ltd.	Prepared by environmental consultant	Limitations of survey are stated in Section 2.5 Survey Limitations (Appendix C)	- Onshore wind farm guidance (DCCEEW 2024) - EPBC Act referral guidelines for three threatened black cockatoo species (Department of Sustainability, Environment, Water, Population and Communities 2012) - Referral guideline for 3 WA threatened black cockatoo species (DAWE 2022) - Recommended bird survey methods to inform impact assessment of onshore wind farms (Scottish Natural Heritage 2017) - Terrestrial vertebrate fauna surveys for environmental impact assessment (Environmental Protection Authority 2020)
Beard, J.S. Beeston G.R. Harvey J.M. Hopkins A.J.M, and D.P. Shepherd. 2013. The vegetation of Western Australia at the 1:3,000,000 scale. Explanatory memoir. Second Edition. Conservation Science Western Australia 9(2), Department of Parks and Wildlife, Perth	Prepared by state government agency	N/A	N/A
Bennetts, S. and Corsini, S. 2022. Addendum Report of an Aboriginal Heritage Survey of the Proposed Waddi Renewable Energy Project Shire of Dandaragan, Western Australia, prepared for Tilt Renewables.	Prepared by heritage consultant	None stated	N/A
Benshemesh, J. 2007. National Recovery Plan for Malleefowl. Department for Environment and Heritage, South Australia. Accessed February 2024 https://www.dcceew.gov.au/sites/default/files/documents/malleefowl.pdf	Prepared by state government agency	N/A	N/A
Berry, P. 2008. Counts of Carnaby’s Cockatoo (<i>Calyptorhynchus latirostris</i>) and records of flock composition at an overnight roosting site in metropolitan Perth. Western Australian Naturalist 26: 1-11. Western Australian Naturalist. 26. 1-11.	Peer reviewed journal article	N/A	N/A
BirdLife Australia. 2024a. Birdata database. Curlew Sandpiper. Accessed February 2024 https://birdata.birdlife.org.au/explore#map=-30.6287502_115.6150963_11&species_id=161	Internet data source based on field handbooks books and international records	N/A	N/A
BirdLife Australia. 2024b. Birdata database. Fork-tailed Swift. Accessed February 2024 https://birdata.birdlife.org.au/explore#map=-30.7895065_115.8496448_10&species_id=335	Internet data source based on field handbooks books and international records	N/A	N/A
BirdLife Australia. 2024c. Birdata database. Sharp-tailed Sandpiper. Accessed February 2024 https://birdata.birdlife.org.au/explore#map=-30.7895065_115.8496448_10&species_id=163	Internet data source based on field handbooks books and international records	N/A	N/A
BirdLife Australia. 2024d. Birdata Database. Pectoral Sandpiper. Accessed February 2024 https://birdata.birdlife.org.au/explore#map=-30.7895065_115.8496448_10&species_id=978	Internet data source based on field handbooks books and international records	N/A	N/A
BirdLife Australia. 2024e. Birdata Database. Common Sandpiper. Accessed February 2024 https://birdata.birdlife.org.au/explore#map=-30.7202050_115.7353304_12&species_id=157	Internet data source based on field handbooks books and international records	N/A	N/A
BirdLife Australia. 2024f. Birdata Database. Carnaby’s Black Cockatoo. Accessed February 2024 https://birdata.birdlife.org.au/explore#map=-30.6224958_115.5151907_12&species_id=794	Internet data source based on field handbooks books and international records	N/A	N/A
Birdlife International. 2022. Species factsheet: Carnaby’s Black-cockatoo <i>Zanda latirostris</i> . Accessed March 2025 https://datazone.birdlife.org/species/factsheet/carnabys-black-cockatoo-zanda-latirostris	Internet data source based on local expert data	N/A	N/A
BirdLife International. 2024a. Species factsheet: <i>Motacilla cinerea</i> . http://datazone.birdlife.org/species/factsheet/grey-wagtail-motacilla-cinerea/text	Internet data source based on field handbooks books and international records	N/A	N/A
BirdLife International. 2024b. Bird Profiles: Curlew Sandpiper. Accessed February 2024 https://birdlife.org.au/bird-profiles/curlew-sandpiper/	Internet data source based on local expert data	N/A	N/A
BirdLife International. 2025. Species factsheet: <i>Thalasseus bergii</i> . Accessed April 2025. http://datazone.birdlife.org/species/factsheet/greater-crested-tern-thalasseus-bergii/text .	Internet data source based on local expert data	N/A	N/A
Bowen, C. and Whitby, R. 2024. Joint media release: Delivering reliable renewables for Western Australia https://minister.dcceew.gov.au/bowen/media-releases/joint-media-release-delivering-reliable-renewables-western-australia	Prepared by Commonwealth and State Government agencies	N/A	N/A
Bureau of Meteorology. 2025. Monthly rainfall Badgingarra Research Stn. Accessed Feburary 2025 http://www.bom.gov.au/jsp/ncc/cdio/weatherData/av?p_nccObsCode=139&p_display_type=dataFile&p_startYear=&p_c=&p_stn_num=009037	Commonwealth government agency website	N/A	N/A
Carbone, G. and L. Afferrante. 2013. A novel probabilistic approach to assess the blade throw hazard of wind turbines. Renewable Energy, Elsevier, vol. 51(C), pages 474-481	Peer reviewed journal article	N/A	N/A
Chown, R. and Johnston, S. 2023. Report of an Aboriginal Heritage Survey of Proposed Waddi Wind Farm Additional Survey Areas 1-5, near Cataby in Shire of Dandaragan, Western Australia, prepared for Tilt Renewables Pty Ltd.	Prepared by heritage consultant	None stated	N/A
Clapin, L. and Longden, T. 2024. Waiting to generate: An analysis of onshore wind and solar PV project development lead-times in Australia. Energy Economics, vol 131	Peer reviewed journal article	N/A	N/A
Colson and Associates. 1995. Avian interactions with wind energy facilities: a summary. Prepared for the American Wind Energy Association, Washington DC, USA.	Prepared for an American trade association	N/A	N/A
Commonwealth of Australia. 2001. National objectives and targets for biodiversity conservation 2001-2005. Canberra, Australian Capital Territory	Prepared by Commonwealth Government agency	N/A	N/A

Reference (source and date)	Reliability	Uncertainties	Key assessment standards
Commonwealth of Australia. 2013. Draft Survey Guidelines for Australia’s Threatened Orchids. Canberra, Australian Capital Territory	Prepared by Commonwealth Government agency	N/A	N/A
Commonwealth of Australia. 2017. EPBC Act Policy Statement 3.21—Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species. Canberra, Australian Capital Territory	Prepared by Commonwealth Government agency	N/A	N/A
Department of Agriculture, Water and the Environment. 2021. Guide to providing maps and boundary data for EPBC Act projects. Canberra, Australian Capital Territory	Prepared by Commonwealth Government agency	N/A	N/A
Department of Agriculture, Water and the Environment. 2022. Referral guideline for 3 WA threatened black cockatoo species. Canberra, Australian Capital Territory	Prepared by Commonwealth Government agency	N/A	N/A
Department of Agriculture, Water and the Environment. 2023. Interim Biogeographic Regionalisation for Australia, Version 7. Accessed February 2024 https://www.dcceew.gov.au/sites/default/files/env/pages/5b3d2d31-2355-4b60-820c-e370572b2520/files/ibra-subregions.pdf	Prepared by Commonwealth Government agency	N/A	N/A
Department of Biodiversity, Conservation and Attractions. 2023. Threatened and Priority Fauna Database Search within the vicinity of Dandaragan as defined by the shapefile provided accessed on the 15 August 2023. Prepared by the Species and Communities Program for M. McCormack from RPS AAP Consulting Pty Ltd to inform the environmental setting in the project’s environmental approval submissions.	Prepared by state Government agency	N/A	N/A
Department of Climate Change, Energy, the Environment and Water. 2023a. Approved Conservation Advice for Honeymyrtle shrubland on limestone ridges of the Swan Coastal Plain Bioregion. Accessed April 2025 https://www.environment.gov.au/biodiversity/threatened/communities/pubs/182-conservation-advice.pdf	Prepared by Commonwealth Government agency	N/A	N/A
Department of Climate Change, Energy, the Environment and Water. 2023b. Conservation Advice for <i>Aphelocephala leucopsis</i> (southern whiteface). Accessed February 2024 http://www.environment.gov.au/biodiversity/threatened/species/pubs/529-conservation-advice-31032023.pdf	Prepared by Commonwealth Government agency	N/A	N/A
Department of Climate Change, Energy, the Environment and Water. 2024a. <i>Actitis hypoleucos</i> – Common Sandpiper in Species Profile and Threats Database. Accessed February 2024 https://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=59309	Commonwealth Government agency website	N/A	N/A
Department of Climate Change, Energy, the Environment and Water. 2024b. <i>Apus pacificus</i> — Fork-tailed Swift in Species Profile and Threats Database. Accessed February 2024 https://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=678	Commonwealth Government agency website	N/A	N/A
Department of Climate Change, Energy, the Environment and Water. 2024c. <i>Calidris acuminata</i> — Sharp-tailed Sandpiper in Species Profile and Threats Database. Accessed February 2024 https://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=874	Commonwealth Government agency website	N/A	N/A
Department of Climate Change, Energy, the Environment and Water. 2024d. <i>Calidris canutus</i> — Red Knot in Species Profile and Threats Database. Accessed February 2024 http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=855	Commonwealth Government agency website	N/A	N/A
Department of Climate Change, Energy, the Environment and Water. 2024e. <i>Calidris ferruginea</i> — Curlew Sandpiper in Species Profile and Threats Database. Accessed February 2024 http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=856	Commonwealth Government agency website	N/A	N/A
Department of Climate Change, Energy, the Environment and Water. 2024f. <i>Calidris melanotos</i> — Pectoral Sandpiper in Species Profile and Threats Database. Accessed February 2024 http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=858	Commonwealth Government agency website	N/A	N/A
Department of Climate Change, Energy, the Environment and Water. 2024g. <i>Calidris ruficollis</i> — Red-necked Stint in Species Profile and Threats Database. Accessed February 2024 http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=860	Commonwealth Government agency website	N/A	N/A
Department of Climate Change, Energy, the Environment and Water. 2024h. <i>Numenius madagascariensis</i> — Eastern Curlew in Species Profile and Threats Database. Accessed February 2024 http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=847	Commonwealth Government agency website	N/A	N/A
Department of Climate Change, Energy, the Environment and Water. 2024i. <i>Pandion haliaetus</i> — Osprey in Species Profile and Threats Database. Accessed February 2024 https://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=952	Commonwealth Government agency website	N/A	N/A
Department of Climate Change, Energy, the Environment and Water. 2024j. <i>Rostratula australis</i> — Australian Painted Snipe in Species Profile and Threats Database. Accessed February 2024 http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=77037	Commonwealth Government agency website	N/A	N/A
Department of Climate Change, Energy, the Environment and Water. 2024k. <i>Sternula nereis nereis</i> — Australian Fairy Tern in Species Profile and Threats Database. Accessed February 2024 http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=82950	Commonwealth Government agency website	N/A	N/A
Department of Climate Change, Energy, the Environment and Water. 2024l. <i>Tringa nebularia</i> — Common Greenshank in Species Profile and Threats Database. Accessed February 2024 http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=832	Commonwealth Government agency website	N/A	N/A
Department of Climate Change, Energy, the Environment and Water. 2024m. <i>Parantechinus apicalis</i> in Species Profile and Threats Database. Accessed February 2024 http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=313	Commonwealth Government agency website	N/A	N/A
Department of Climate Change, Energy, the Environment and Water. 2024n. <i>Egernia stokesii badia</i> — Western Spiny-tailed Skink in Species Profile and Threats Database. Accessed February 2024 http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=64483	Commonwealth Government agency website	N/A	N/A
Department of Climate Change, Energy, the Environment and Water. 2024o. Carnaby's black-cockatoo - <i>Calyptorhynchus latirostris</i> . Accessed March 2024 https://www.dcceew.gov.au/environment/biodiversity/threatened/publications/carnabys-black-cockatoo-calyptorhynchus-latirostris	Commonwealth Government agency website	N/A	N/A
Department of Climate Change, Energy, the Environment and Water. 2024p. Draft Onshore wind farm guidance - best practice approaches when seeking approval under Australia’s national environment law. Canberra, Australian Capital Territory	Prepared by Commonwealth Government agency	N/A	N/A
Department of Climate Change, Energy, the Environment and Water. 2024q. Offsets Mitigation Hierarchy. Accessed December 2024 https://www.dcceew.gov.au/environment/epbc/approvals/offsets/guidance/mitigation-hierarchy	Prepared by Commonwealth Government agency	N/A	N/A

Reference (source and date)	Reliability	Uncertainties	Key assessment standards
Department of Climate Change, Energy, the Environment and Water. 2024r. Environmental Management Plan Guidelines, Department of Climate Change, Energy, the Environment and Water, Canberra, March.	Prepared by Commonwealth Government agency	N/A	N/A
Department of Climate Change, Energy, the Environment and Water. 2024s. Annual Climate Change Statement 2024. Canberra, Australian Capital Territory	Prepared by Commonwealth Government agency	N/A	N/A
Department of Climate Change, Energy, the Environment and Water. 2025a. Protected Matters Search Tool. Accessed February 2025. https://pmst.environment.gov.au/	Commonwealth Government agency website	N/A	N/A
Department of Climate Change, Energy, the Environment and Water. 2025b. <i>Arenaria interpres</i> – Ruddy Turnstone in Species Profile and Threats Database. Accessed April 2025. http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=872 .	Commonwealth Government agency website	N/A	N/A
Department of Climate Change, Energy, the Environment and Water. 2025c. <i>Charadrius leschenaultii</i> – Greater Sand Plover in Species Profile and Threats Database. Accessed April 2025. http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=877 .	Commonwealth Government agency website	N/A	N/A
Department of Climate Change, Energy, the Environment and Water. 2025d. <i>Limosa lapponica</i> – Bar-tailed Godwit in Species Profile and Threats Database. Accessed April 2025. https://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=844 .	Commonwealth Government agency website	N/A	N/A
Department of Climate Change, Energy, the Environment and Water. 2025e. <i>Plegadis falcinellus</i> — Glossy Ibis in Species Profile and Threats Database. Accessed April 2025. https://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=991 .	Commonwealth Government agency website	N/A	N/A
Department of Climate Change, Energy, the Environment and Water. 2025f. <i>Pluvialis fulva</i> — Pacific Golden Plover in Species Profile and Threats Database. Accessed April 2025. http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=25545 .	Commonwealth Government agency website	N/A	N/A
Department of Climate Change, Energy, the Environment and Water. 2025g. <i>Pluvialis squatarola</i> — Grey Plover in Species Profile and Threats Database. Accessed April 2025. https://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=865 .	Commonwealth Government agency website	N/A	N/A
Department of Climate Change, Energy, the Environment and Water. 2025h. <i>Tringa glareola</i> — Wood Sandpiper in Species Profile and Threats Database. Accessed April 2025. http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=829 .	Commonwealth Government agency website	N/A	N/A
Department of Climate Change, Energy, the Environment and Water. 2025i. <i>Zanda latirostris</i> in Species Profile and Threats Database. Accessed April 2025. https://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=59523	Commonwealth Government agency website	N/A	N/A
Department of Defence. 2025. Defence UXO Mapping Application. Accessed February 2025 https://uxo.defence.gov.au/where-unexploded-ordnance	Prepared by Commonwealth Government agency	N/A	N/A
Department of Environment and Conservation. 2008. <i>Dryandra fuscobractea</i> Interim Recovery Plan 2008-2013. Interim Recovery Plan No. 285. Department of Environment and Conservation, Western Australia.	Prepared by state government agency	N/A	N/A
Department of Environment and Conservation. 2009. Glossy-leafed Hammer Orchid (<i>Drakaea elastica</i>) Recovery Plan. Kensington, Western Australia	Prepared by state government agency	N/A	N/A
Department of Environment and Conservation. 2012a. Chuditch (<i>Dasyurus geoffroii</i>) Recovery Plan. Wildlife Management Program No. 54. Kensington, Western Australia	Prepared by state government agency	N/A	N/A
Department of Environment and Conservation. 2012b. A guide to managing and restoring wetlands in Western Australia. Department of Environment and Conservation, Perth, Western Australia.	Prepared by state government agency	N/A	N/A
Department of Environment, Water, Heritage and the Arts. 2009. EPBC Act Policy Statement 2.3: Wind Farm Industry. Canberra, Australian Capital Territory	Prepared by Commonwealth Government agency	N/A	N/A
Department of the Environment and Energy. 2018. Guidelines for biological survey and mapped data. Canberra, Australian Capital Territory	Prepared by Commonwealth Government agency	N/A	N/A
Department of Parks and Wildlife. 2013. Carnaby’s Cockatoo (<i>Calyptorhynchus latirostris</i>) Recovery Plan. Kensington, Western Australia	Prepared by state government agency	N/A	N/A
Department of Parks and Wildlife. 2015. Clay pans of the Swan Coastal Plain (Community types 7, 8, 9 and 10a – Gibson et al. 1994 and Clay pans with mid dense shrublands of <i>Melaleuca lateritia</i> over herbs): Interim Recovery Plan 2015–2020 (Interim Recovery Plan No. 354).	Prepared by state government agency	N/A	N/A
Department of Planning, Lands and Heritage. 2024. Aboriginal Cultural Heritage Inquiry System. Accessed February 2024 https://espatial.dplh.wa.gov.au/ACHIS/index.html?viewer=ACHIS	State government agency website	N/A	N/A
Department of Primary Industries and Regional Development. 2025. Badgingarra (BA). Accessed February 2025 https://weather.agric.wa.gov.au/station/BA	State government agency website	N/A	N/A
Department of Sustainability, Environment, Water, Population and Communities. 2012. <i>Environment Protection Biodiversity Conservation Act 1999</i> Environmental Offsets Policy. Canberra, Australian Capital Territory	Prepared by Commonwealth Government agency	N/A	N/A
Department of the Environment. 2013. Matters of National Environment Significance: Significant Impact Guidelines 1.1. Canberra, Australian Capital Territory	Prepared by Commonwealth Government agency	N/A	N/A
Department of the Environment. 2014. Environmental Management Plan Guidelines. Canberra, Australian Capital Territory	Prepared by Commonwealth Government agency	N/A	N/A
Department of the Environment. 2015a. Draft referral guideline for 14 birds listed as migratory species under the EPBC Act. Canberra, Australian Capital Territory	Prepared by Commonwealth Government agency	N/A	N/A
Department of the Environment. 2015b. Threat abatement plan for predation by feral cats. Canberra, Australian Capital Territory	Prepared by Commonwealth Government agency	N/A	N/A

REPORT

Reference (source and date)	Reliability	Uncertainties	Key assessment standards
Department of the Environment. 2025a. <i>Thelymitra stellata</i> in Species Profile and Threats Database. Canberra, Australian Capital Territory	Prepared by Commonwealth Government agency	N/A	N/A
Department of the Environment. 2025b. <i>Caleana dixonii</i> in Species Profile and Threats Database. Canberra, Australian Capital Territory	Prepared by Commonwealth Government agency	N/A	N/A
Department of the Environment, Water, Heritage and the Arts. 2008a. Approved Conservation Advice for <i>Eucalyptus pruiniramis</i> (Midlands Gum). Canberra: Department of the Environment, Water, Heritage and the Arts.	Prepared by Commonwealth Government agency	N/A	N/A
Department of the Environment, Water, Heritage and the Arts. 2008b. Approved Conservation Advice for <i>Eucalyptus suberea</i> (Cork Mallee). Canberra: Department of the Environment, Water, Heritage and the Arts.	Prepared by Commonwealth Government agency	N/A	N/A
Department of the Environment, Water, Heritage and the Arts. 2008c. Approved Conservation Advice for <i>Thelymitra stellata</i> (Star Sun-orchid). Canberra: Department of the Environment, Water, Heritage and the Arts.	Prepared by Commonwealth Government agency	N/A	N/A
Department of the Environment, Water, Heritage and the Arts. 2008d. Approved Conservation Advice for <i>Anigozanthos viridis</i> subsp. <i>terraspectans</i> (Dwarf Green Kangaroo Paw). Canberra: Department of the Environment, Water, Heritage and the Arts.	Prepared by Commonwealth Government agency	N/A	N/A
Department of the Environment, Water, Heritage and the Arts. 2008e. Approved Conservation Advice for <i>Hakea megalosperma</i> (Lesueur Hakea). Canberra: Department of the Environment, Water, Heritage and the Arts.	Prepared by Commonwealth Government agency	N/A	N/A
Department of the Environment, Water, Heritage and the Arts. 2009. Approved Conservation Advice for <i>Banksia fuscobractea</i> (Dark-bract Banksia). Canberra, ACT: Department of the Environment, Water, Heritage and the Arts.	Prepared by Commonwealth Government agency	N/A	N/A
Department of the Environment and Energy. 2016a. Approved Conservation Advice (incorporating listing advice) for the Banksia Woodlands of the Swan Coastal Plain ecological community. Accessed February 2024 http://www.environment.gov.au/biodiversity/threatened/communities/pubs/131-conservation-advice.pdf	Prepared by Commonwealth Government agency	N/A	N/A
Department of the Environment and Energy. 2016b. Banksia Woodlands of the Swan Coastal Plain: a nationally protected ecological community. Canberra, Australian Capital Territory	Prepared by Commonwealth Government agency	N/A	N/A
Department of the Environment and Energy. 2016c. Threat abatement plan for competition and land degradation by rabbits. Canberra, Australian Capital Territory	Prepared by Commonwealth Government agency	N/A	N/A
Department of the Environment and Energy. 2018a. Threatened Species Strategy – Year 3 Priority Species Scorecard (2018) Woylie <i>Bettongia penicillata ogilbyi</i> . Canberra, Australian Capital Territory	Prepared by Commonwealth Government agency	N/A	N/A
Department of the Environment and Energy. 2018b. Threat abatement plan for disease in natural ecosystems caused by <i>Phytophthora cinnamomic</i> . Canberra, Australian Capital Territory	Prepared by Commonwealth Government agency	N/A	N/A
Department of Water. 2010. Jurien groundwater allocation plan. Accessed February 2024 https://www.wa.gov.au/system/files/2022-07/Jurien-groundwater-allocation-plan.pdf	Prepared by state government agency	N/A	N/A
Department of Water. 2015. Gingin groundwater allocation plan. Accessed February 2024 https://www.wa.gov.au/system/files/2022-03/Gingin-groundwater-allocation-plan-2015.pdf	Prepared by state government agency	N/A	N/A
Department of Water. 2017. Department of Water, 2017, Northern Perth Basin: Geology, hydrogeology and groundwater resources, Hydrogeological bulletin series, report no. HB1, Department of Water, Government of Western Australia, Perth.	Prepared by state government agency	N/A	N/A
Department of Water and Environmental Regulation. 2018. Groundwater-dependent environmental values of the Dinner Hill and Irwin focus areas. Accessed March 2025. https://www.wa.gov.au/system/files/2024-10/groundwater-dependent-environmental-values-of-the-dinner-hill-and-irwin-focus-areas.pdf	Prepared by state government agency	N/A	N/A
Department of Water and Environmental Regulation. 2025a. Water Register. Accessed February 2025 https://maps.water.wa.gov.au/#/webmap/register	State government agency website	N/A	N/A
Department of Water and Environmental Regulation. 2025b. Water Information Reporting. Accessed February 2025 https://wir.water.wa.gov.au/Pages/Water-Information-Reporting.aspx	State government agency website	N/A	N/A
Desmond, A. and A. Chant. 2001. Geraldton Sandplain 3 (GS3 Lesueur Sandplain subregion. From ‘A Biodiversity Audit of Western Australia’s 53 Biogeographical subregions in 2002. Jelena May and Norm McKenzie Editors. Department of Conservation and Land Management, Perth Western Australia	State government agency website	N/A	N/A
Drewitt, A.L. and R.H.W Langston. 2006. Assessing the impacts of wind farms on birds. Ibis 148, 29-42.	Peer reviewed journal article	N/A	N/A
Dutson, G. 2009, Australia’s important bird areas - key sites for bird conservation. Melbourne, Victoria	Published book	N/A	N/A
Ebird Database. 2024. Dandaragan. Accessed February 2024 https://ebird.org/region/AU-WA-DAN?yr=all	Internet data source based on field handbooks books and international records	N/A	N/A
Ecologia Environment. 2016. Supplementary Flora, Vegetation and Fauna Survey. Unpublished report prepared for Waddi Wind Farm Pty Ltd	Prepared by environmental consultant	None stated	- Guidance Statement No. 51: Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia - Technical Guide: Terrestrial Vertebrate Fauna Surveys

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Reference (source and date)	Reliability	Uncertainties	Key assessment standards
Ecologia Environment. 2017. Flora, Vegetation and Avifauna Assessment. Unpublished report prepared for Wind Prospects	Prepared by environmental consultant	Limitations of survey are stated in Section 5.4 Survey Limitations and Constraints	• Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment • Technical Guidance: Terrestrial Fauna Surveys
Ecoscape. 2018. Carnaby's cockatoo and other birds baseline monitoring report 2018: Badgingarra Wind Farm. Unpublished report prepared for APA	Prepared by environmental consultant	None stated	Monitoring methodology underpinned by expert opinion
Ecoscape. 2019a. Carnaby's cockatoo and other birds year one operational monitoring. Unpublished report prepared for APA	Prepared by environmental consultant	None stated	Monitoring methodology from Ecoscape (2018) adapted
Ecoscape 2019b. Field Summary Report – spring 19. Unpublished report prepared for APA	Prepared by environmental consultant	None stated	N/A
Ecoscape 2020. Field Summary Report – spring 20. Unpublished report prepared for APA	Prepared by environmental consultant	None stated	N/A
Emerge Associates. 2024. Basic Fauna and Targeted Bird and Bat Assessment Parron Wind Farm Development Support. Report prepared for Zephyr Energy Pty Ltd.	Prepared by environmental consultant	Limitations of survey are stated in Section 3.3 Survey Limitations	Technical Guidance: Terrestrial Fauna Surveys
Environment Australia. 2001. A Directory of Important Wetlands in Australia: Third edition. Accessed February 2024 https://www.dcceew.gov.au/sites/default/files/documents/directory.pdf	Prepared by Commonwealth Government agency	N/A	N/A
Environmental Protection Authority. 2015. Perth and Peel @3.5 Million, Environmental impacts, risks and remedies. Perth, Western Australia.	Prepared by state government	N/A	N/A
Environmental Protection Authority. 2016. Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment. Perth, Western Australia.	Prepared by state government	N/A	N/A
Geoscience Australia. 1976. Dandaragan 1:100 000 topographic map. Accessed February 2024 https://ecat.ga.gov.au/geonetwork/srv/eng/catalog.search#/metadata/45645	Prepared by Commonwealth Government agency	N/A	N/A
Geoscience Australia. 2001. Wedge Island 1:100 000 topographic map. Accessed February 2024 https://ecat.ga.gov.au/geonetwork/srv/eng/catalog.search#/metadata/45615	Prepared by Commonwealth Government agency	N/A	N/A
Government of Western Australia. 2019. 2018 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full Report). Current as of March 2019 Accessed February 2024 https://catalogue.data.wa.gov.au/dataset/dbca-statewide-vegetation-statistics	Prepared by state government agency	N/A	N/A
Government of Western Australia. 2021. Energy Infrastructure Map. Accessed April 2025 https://www.wa.gov.au/system/files/2021-12/Energy_Infrastructure_MAP_A0_Aug_2021_o.pdf	Prepared by state government agency	N/A	N/A
Goode, B. and Harris, J. 2012. Report of an Aboriginal Heritage Survey of the Proposed Waddi & Yandin Wind Farms in the Shire of Dandaragan, Western Australia, prepared for Wind Prospect Pty Ltd.	Prepared by heritage consultant	None stated	N/A
Goode, B. and Harris, J. 2016. Addendum Report of an Aboriginal Heritage Survey of the Proposed Waddi & Yandin Wind Farms in the Shire of Dandaragan, Western Australia, prepared for Wind Prospect Pty Ltd.	Prepared by heritage consultant	None stated	N/A
Griffin, E.A. 1994. Floristic Survey of the Northern Sandplains between Perth and Geraldton. Department of Primary Industries and Regional Development, Western Australia, Perth. Report 144.	Prepared by state government agency	N/A	N/A
Groom, C. 2010. Artificial hollows for Carnaby's Black Cockatoo. An investigation of the placement, use, monitoring and maintenance requirements of artificial hollows for Carnaby's black cockatoo. Kensington, Western Australia	Prepared by state government agency	N/A	N/A
Groom, C. 2011. Plants used by Carnaby's Black Cockatoo. chrome-extension://efaidnbmnmbn/pcaajpcglclefindmkaj/ https://www.armadale.wa.gov.au/sites/default/files/assets/documents/docs/Environmental_Management/cockatoo.pdf	Prepared by state government agency	N/A	N/A
Groom, C. 2015. Roost site fidelity and resource use by Carnaby's cockatoo, <i>Calyptorhynchus latirostris</i> , on the Swan coastal plain, Western Australia.	Published thesis	N/A	N/A
Higgins, P. and J. Davies. 1996. Handbook of Australian, New Zealand and Antarctic Birds. Volume 3, Snipe to Pigeons. Oxford University Press Melbourne Pages 1049-1052, 1081-1 090.	Peer reviewed textbook accessed online	N/A	N/A
Jeanes, J. A., 2006. Resolution of the <i>Thelymitra fuscolutea</i> R. Br.(Orchidaceae) complex of southern Australia. Muelleria, 24, 3-24.	Peer reviewed journal article	N/A	N/A
Johnstone, R. E. and G.M. Storr.1998. Handbook of Western Australian Birds. Volume 1 – Non-passerines (Emu to Dollarbird). Western Australian Museum.	Prepared by Western Australian Museum	N/A	N/A
Johnstone. R.E and T Kirkby. 2019a. Carnaby's Cockatoo Surveys at Western Areas, New Morning Project Forrestania. Accessed February 2024 https://www.epa.wa.gov.au/sites/default/files/Referral_Documentation/CMS18052%20-%20Appendix%209%20-%20Target_el%20Project%20-%20Western%20Areas%20Ltd.PDF	Prepared by environmental consultant	None stated	N/A
Johnstone.,R.E and Kirkby, T. 2019b. Black Cockatoo Research Project - Final Report for Housing Authority 2019. Accessed March 2024 https://museum.wa.gov.au/sites/default/files/Black%20Cockatoo%20Research%20Project%20-%20Final%20Report%202019%20DOH.pdf	Prepared by Western Australian Museum	N/A	N/A
Landgate. 2025. Locate V5. Accessed February 2025 https://maps.slip.wa.gov.au/landgate/locate/	State government agency website	N/A	N/A
Le Roux, C. 2017. Nocturnal roost tree, roost site and landscape characteristics of Carnaby's Black-Cockatoo (<i>Calyptorhynchus latirostris</i>) on the Swan Coastal Plain. Edith Cowan University. Retrieved from https://ro.ecu.edu.au/theses/2017 .	Published thesis	N/A	N/A
Longcore, T., Rich, C., and Gauthreaux Jr., S, 2008, Height, guy wires, and steady-burning lights increase hazard of communication towers to nocturnal migrants: A review and meta-analysis, The Auk, 125(2): 485-492.	Peer reviewed journal article	N/A	N/A

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Reference (source and date)	Reliability	Uncertainties	Key assessment standards
Luu, R., and English, V. 2005. <i>Melaleuca huegelii</i> – <i>Melaleuca systema</i> shrublands of limestone ridges (Swan Coastal Plain Community type 26a – Gibson et al. 1994): Interim Recovery Plan 2004–2009 (Interim Recovery Plan No. 193). Department of Conservation and Land Management.	Prepared by state government agency	N/A	N/A
Mitchell, D. Williams, K. and A. Desmond. 2002. Swan Coastal Plain 2 (SWA2 – Swan Coastal Plain subregion). From ‘A Biodiversity Audit of Western Australia’s 53 Biogeographical subregions in 2002. Jelena May and Norm McKenzie Editors. Department of Conservation and Land Management, Perth Western Australia	State government agency website	N/A	N/A
Murdoch University. 2024. Desktop analysis of black cockatoo tracking data to show movement and site utilisation of Carnaby's cockatoos in the Cataby Region with reference to the Waddi Wind Farm. Unpublished report prepared for Tilt Renewables	Private university research paper	N/A	N/A
New Zealand Wind Energy Association. (NZWEA) 2005. Fact sheet 8 – Birds and bats. New Zealand Wind Energy Association.	National peak body website	N/A	N/A
Outback Ecology. 2010. Waddi Wind Farm Targeted Level 1 Vegetation and Flora Assessment. Unpublished report prepared for RPS	Prepared by environmental consultant	Limitations of survey are stated in Section 3.5 <i>Limitation of Survey</i> (see Appendix M)	- Position Statement No. 3: Terrestrial Biological Surveys as an Element of Biodiversity Protection - Guidance Statement No. 51: Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia
Outback Ecology. 2014. Waddi Wind Farm spring Flora and Vegetation Survey and Black Cockatoo Habitat Survey. Unpublished report prepared for RPS	Prepared by environmental consultant	Limitations of survey are stated in Section 3.4 <i>Constraints and Limitations</i> (see Appendix J)	- Position Statement No. 3: Terrestrial Biological Surveys as an Element of Biodiversity Protection - Guidance Statement No. 51: Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia - Guidance Statement No. 56: Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia - Technical Guide: Terrestrial Vertebrate Fauna Surveys - Survey Guidelines for Australia’s Threatened Birds - EPBC Act Referral Guidelines for Three Threatened Black Cockatoo Species (Department of Sustainability, Environment, Water, Population and Communities 2012)
Pryor, M., Barrett, G., and Williams, M. 2023. The 2021 and 2022 Great Cocky Count: a community-based survey for Carnaby's Black-Cockatoo (<i>Zanda latirostris</i>), Baudin's Black-Cockatoo (<i>Zanda baudinii</i>) and Forest Redtailed Black-Cockatoo (<i>Calyptorhynchus banksii naso</i>). BirdLife Australia, Floreat, Western Australia	Report on citizen science survey results	N/A	N/A
Ratch and Alinta Energy. 2024. Yandin Wind Farm. Accessed February 2024 https://www.yandinwindfarm.com.au/	Alinta energy website	N/A	N/A
RPS. 2010a. Avifauna Assessment, Proposed Wind Farm Development Dandaragan Shire. Unpublished report prepared for Wind Prospect	Prepared by environmental consultant	Limitations of survey are stated in Section 2.5 <i>Limitations</i> (see Appendix L)	- Guidance Statement No. 56: Guidance Statement for Terrestrial Fauna Surveys for Environmental Impact in Western Australia - Best Practice Guidelines for Implementation of Wind Energy Projects in Australia - wind farms and Birds: Interim Standards for Risk Assessment - Supplementary Significant Impact Guidelines 2.1.1: Wind Farm Industry Sector - Wind farm collision risk for birds: Cumulative risks for threatened and migratory species
RPS. 2010b. Fauna Assessment, Waddi Wind Farm. Unpublished report prepared for Wind Prospect	See Fauna Assessment, Waddi Wind Farm (RPS 2014)		
RPS. 2014. Fauna Assessment, Waddi Wind Farm. Unpublished report prepared for Waddi Wind Farm Pty Ltd	Prepared by environmental consultant	Limitations of survey are stated in Section 3.2 Survey Constraints and Limitations (see Appendix K)	- Position Statement No. 3: Terrestrial Biological Surveys as an Element of Biodiversity Protection - Guidance Statement No. 56: Guidance Statement for Terrestrial Fauna Surveys for Environmental Impact in Western Australia

REPORT

Reference (source and date)	Reliability	Uncertainties	Key assessment standards
RPS. 2023. Reconnaissance flora and vegetation assessment. Waddi Wind Farm. Unpublished report prepared for Tilt Renewables	Prepared by environmental consultant	Limitations of survey are stated in Section 3.3 <i>Limitations</i> (see Appendix G)	Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment
RPS. 2025. Targeted star sun-orchid and sandplain duck orchid searches. Unpublished report prepared for Tilt Renewables	Prepared by environmental consultant	None stated	• Draft Survey Guidelines for Australia’s Threatened Orchids (Commonwealth of Australia 2013) • Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016)
RPS and Tilt Renewables. 2023. Appendix O Review of unsurveyed planted trees. Unpublished appendix for an EPBC Act referral, prepared for Tilt Renewables	Prepared by environmental consultant	N/A	N/A
Saunders, D. A. 1980. Food and movements of the short-billed form of the white-tailed black cockatoo. Aust. Wildl. Res. 7:257-69.	Peer reviewed journal article	N/A	N/A
Saunders, D.A. 1982. The breeding behaviour and biology of the short-billed form of the White-tailed Black Cockatoo <i>Calyptrorhynchus funereus</i> . Ibis 124, 422-455.	Peer reviewed journal article	N/A	N/A
Saunders, D. A., Dawson, R. Doley, A., Lauri, J., Le Souef, A., Mawson, P., Warren, K. and N. White. 2014. Nature conservation on agricultural land: a case study of the endangered Carnaby’s Cockatoo <i>Calyptrorhynchus latirostris</i> breeding at Koobabbie in the northern wheatbelt of Western Australia. Nature Conservation 9: 19–43	Peer reviewed journal article	N/A	N/A
Saunders, D.A., Dawson, R. and P.R. Mawson. 2023. Artificial nesting hollows for the conservation of Carnaby's cockatoo <i>Calyptrorhynchus latirostris</i> : definitely not a case of erect and forget. Pacific Conservation Biology, 29(2), 119–129	Peer reviewed journal article	N/A	N/A
Shepherd, D. P., Beeston, G. R., and Hopkins, A. J. 2002. Native vegetation in Western Australia: extent, type and status. Department of Primary Industries and Regional Development, Western Australia, Perth. Report 249. https://library.dpird.wa.gov.au/rmtr/235	Prepared by state government agency	N/A	N/A
Shire of Dandaragan. 2020. Envision 2029: Economic and Tourism Development Strategy. Accessed 13 February 2024, https://www.dandaragan.wa.gov.au/Profiles/dandaragan/Assets/ClientData/Document-Centre/publications/Economic_and_Tourism_Development_Strategy_2029.pdf	Prepared by local government authority	N/A	N/A
Smales. I. 2006. Impacts of avian collisions with wind power turbines: an overview of the modelling of cumulative risks posed by multiple wind farms. Report prepared by Biosis Research for the Department of Environment and Heritage.	Prepared for Commonwealth Government agency	N/A	N/A
Stahl, J.T. and M.K. Oli. 2006. Relative importance of avian life-history variables to population growth rate. Ecological Modelling, vol. 198, no. 1, pp. 23-39.	Peer reviewed journal article	N/A	N/A
Surefire Environmental Pty Ltd. 2025. Offset Management Strategy. Unpublished report prepared for Tilt Renewables	Prepared by environmental consultant	None stated	N/A
Terrestrial Ecosystems. 2022. Black-Cockatoo habitat assessment for the Waddi Wind Farm transmission line alignment and the nominated areas in the adjacent farmland. Unpublished report prepared for RPS	Prepared by environmental consultant	None stated	Referral guideline for 3 WA threatened black cockatoo species (Department of Agriculture, Water and the Environment 2022)
Threatened Species Scientific Committee. 2012. Commonwealth Listing Advice on Claypans of the Swan Coastal Plain. Accessed Feburary 2025 https://www.environment.gov.au/biodiversity/threatened/communities/pubs/121-listing-advice.pdf	Prepared by Threatened Species Scientific Committee	N/A	N/A
Threatened Species Scientific Committee. 2013. Commonwealth Listing Advice on <i>Pezoporus wallicus flaviventris</i> (western ground parrot). Accessed February 2024 http://www.environment.gov.au/biodiversity/threatened/species/pubs/84650-listing-advice.pdf	Prepared by Threatened Species Scientific Committee	N/A	N/A
Threatened Species Scientific Committee. 2015. Conservation Advice <i>Parantechinus apicalis</i> dibbler. Accessed February 2024 http://www.environment.gov.au/biodiversity/threatened/species/pubs/313-conservation-advice-01102015.pdf	Prepared by Threatened Species Scientific Committee	N/A	N/A
Threatened Species Scientific Committee. 2016. Conservation Advice <i>Macroderma gigas</i> ghost bat. Accessed February 2024 http://www.environment.gov.au/biodiversity/threatened/species/pubs/174-conservation-advice-05052016.pdf	Prepared by Threatened Species Scientific Committee	N/A	N/A
Threatened Species Scientific Committee. 2018a. Conservation Advice <i>Acacia wilsonii</i> Wilson's wattle. Accessed Feburary 2025 https://www.environment.gov.au/biodiversity/threatened/species/pubs/65228-conservation-advice-11052018.pdf	Prepared by Threatened Species Scientific Committee	N/A	N/A
Threatened Species Scientific Committee. 2018b. Conservation advice <i>Bettongia penicillata</i> woylie. Accessed Feburary 2025 https://www.environment.gov.au/biodiversity/threatened/species/pubs/213-conservation-advice-01022018.pdf	Prepared by Threatened Species Scientific Committee	N/A	N/A
Threatened Species Scientific Committee. 2019. Conservation Advice <i>Botaurus poiciloptilus</i> Australasian Bittern. Accessed April 2025. https://www.environment.gov.au/biodiversity/threatened/species/pubs/1001-conservation-advice-18012019.pdf	Prepared by Threatened Species Scientific Committee	N/A	N/A
Tilt Renewables. 2024a. We tilt for the future, About Tilt Renewables. Accessed February 2024 https://www.tiltrenewables.com/about-tilt-renewables/	Proponent’s website	N/A	N/A
Tilt Renewables. 2024b. Why we tilt, The story behind Tilt Renewables. Accessed February 2024 https://www.tiltrenewables.com/about-tilt-renewables/tilt-story/	Proponent’s website	N/A	N/A
Tilt Renewables. 2024c. We tilt with the wind, we tilt towards the sun, Our renewable portfolio. Accessed February 2024 https://www.tiltrenewables.com/assets-and-projects/	Proponent's website	N/A	N/A

Reference (source and date)	Reliability	Uncertainties	Key assessment standards
Tilt Renewables. 2024d. Planning and approvals. Accessed February 2024 https://www.tiltrenewables.com/assets-and-projects/Palmer-Wind-Farm/planning-and-approvals/	Proponent's website	N/A	N/A
Vestas. 2023. Life Cycle Assessment of Electricity Production from an Onshore V162-6.2 MW Wind Plant. Vestas Wind Systems A/S.	Prepared by equipment manufacturer	N/A	N/A
Western Australian Herbarium. 1998–. FloraBase—the Western Australian Flora. Accessed February 2025 https://florabase.dbca.wa.gov.au/	State government agency website	N/A	N/A
Williams, M.R., Yates, C.J., Saunders, D.A., Dawson, R and G.W. Barrett. 2017. Combined demographic and resource models quantify the effects of potential land-use change on the endangered Carnaby's cockatoo (<i>Calyptorhynchus latirostris</i>). Biological Conservation, vol. 210, pp. 8-15	Peer reviewed journal article	N/A	N/A
Winkelman, J.E. 1992. The Impact of the Sep Wind Park Near Oosterblerum (Fr.), the Netherlands, on Birds, 1: Collision Victims. RIN report no. 92/2.	Peer reviewed journal article	N/A	N/A
Wind Prospect. 2011. Proposed Dandaragan wind farms, Central Midlands, Western Australia, Environmental Statement, Volume 2	Report prepared by renewable energy developer	None stated	N/A
Zephyr Energy Pty Ltd. 2024. Parron Wind Farm EPBC Act referral. Accessed March 2025. https://epbcpublicportal.environment.gov.au/all-referrals/project-referral-summary/project-decision/?id=b6dfdb56-c1cb-ef11-b8e8-002248978a7f	Prepared by renewable energy developer	N/A	N/A

Table 29: Information sources for the Preliminary documentation figures

Figure ID	Figure title	Source data or other evidence used	Currency of dataset(s)	Methodology to create figures
Contained within report text				
Figure 1	Waddi Wind Farm – infrastructure	• Datasets prepared by state government agencies: – Aerial imagery and cadastre by Landgate • Datasets prepared by Tilt Renewables: – Project Area – Indicative works area – Disturbance area – Proposed infrastructure – Existing infrastructure – Dwellings	• Project Area (Last updated: 17 May 2023) • Indicative works area (Last updated: 7 March 2025) • Disturbance area (Last updated: 26 February 2025) • Proposed infrastructure, Existing infrastructure and Dwellings (Last updated: 19 March 2025)	• Aerial imagery sourced from Landgate was overlaid on the map • The Project Area, Indicative works area and Disturbance area footprints and Proposed infrastructure, Existing infrastructure and Dwellings prepared by Tilt Renewables were then overlaid on the map
Figure 2	Works within Cooljarloo Mine (Lot 3 on Plan 408189)	• Datasets prepared by state government agencies: – Aerial imagery and cadastre by Landgate • Datasets prepared by Tilt Renewables: – Project Area – Indicative works area – Disturbance area – Existing access tracks	• Project Area (Last updated: 17 May 2023) • Indicative works area (Last updated: 7 March 2025) • Disturbance area (Last updated: 26 February 2025) • Existing access tracks (Last updated: 25 March 2025)	• Aerial imagery sourced from Landgate was overlaid on the map • The Project Area, Indicative works area and Disturbance area footprints and Existing access tracks prepared by Tilt Renewables were then overlaid on the map
Figure 3	Tilt Renewables' gated development process	Includes information from Tilt Renewables' development process.	Last updated: 9 May 2024	Presented Tilt Renewables' development process in a flowchart.
Figure 4	Alternative transmission line alignments	• Datasets prepared by state government agencies: – Aerial imagery, cadastre and Roads (Simplified) (LGATE-195) by Landgate – NCMT High Voltage Overhead Transmission Lines (WP-051) by Western Power • Datasets prepared by Tilt Renewables: – Project Area – Indicative works area – Disturbance area – Approved 2018 alignment (EPBC 2018/8352) – Proposed transmission line options	• WP-051 (Last updated: 18 November 2024) • LGATE-195 (Last updated: 14 April 2025) • Project Area (Last updated: 17 May 2023) • Indicative works area (Last updated: 7 March 2025) • Disturbance area (Last updated: 26 February 2025) • Approved 2018 alignment and proposed transmission line options (Last updated: 28 March 2025)	• Aerial imagery sourced from Landgate was overlaid on the map with Overhead Transmission Lines data derived from Western Power (dataset: WP-051) and cadastre and Roads (Simplified) derived from Landgate (dataset: LGATE-195) • The Project Area, Indicative works area and Disturbance area footprints and approved 2018 alignment (EPBC 2018/8352) and proposed transmission line options prepared by Tilt Renewables were then overlaid on the map

Figure ID	Figure title	Source data or other evidence used	Currency of dataset(s)	Methodology to create figures
Figure 5	Proximate Dandaragan wind farms	• Datasets prepared by state government agencies: – Aerial imagery and Roads (Simplified) (LGATE-195) by Landgate • Datasets prepared by Tilt Renewables: – Project Area – Indicative works area – Disturbance area – Indicative turbine layout • Datasets prepared by Renewmap – Project boundaries of operating and proposed wind farms within 30 km of the Project Area	• LGATE-195 (Last updated: 14 April 2025) • Project Area (Last updated: 17 May 2023) • Indicative works area (Last updated: 7 March 2025) • Disturbance area (Last updated: 26 February 2025) • Turbine layout (Last updated: 13 March 2023) • Renewmap data (Last updated: 14 April 2025)	• Aerial imagery sourced from Landgate was overlaid on the map with Overhead Transmission Lines data derived from Western Power (dataset: WP-051) and Roads (Simplified) derived from Landgate (dataset: LGATE-195) • The Project Area, Indicative works area and Disturbance area footprints and turbine layout prepared by Tilt Renewables were then overlaid on the map • Renewmap's project boundaries of operating and proposed wind farms within 30 km of the Project Area were then overlaid on the map and presented under the subheadings of 'Neighbouring Renewable Developments (Operational)' and 'Neighbouring Renewable Developments (Proposed)'
Figure 6	Seasonal migration patterns of Carnaby's cockatoo	Sourced from Williams et al. 2017	N/A	N/A
Figure 7	Migration and movements of Carnaby's cockatoo	Sourced from Johnstone and Kirkby 2019b	N/A	N/A
Figure 8	Known Carnaby's cockatoo breeding areas in relation to the Project Area	• Datasets prepared by state government agencies: – Aerial imagery by Landgate – Conservation areas (DBCA-011) and Black Cockatoo breeding sites - buffered (DBCA-063) by DBCA – Directory of important wetlands in Australia (DBCA-045) and Geomorphic wetlands (DBCA-013, DBCA-014, DBCA-015 and DBCA-019) by DBCA – Hydrography Linear (Hierarchy) (DWER-031) by DWER – Farm dams of Western Australia (DPIRD-083) by DPIRD – Native Vegetation Extent (DPIRD-005) and Pre-European Vegetation (DPIRD-006) • Datasets prepared by bird experts: – Key biodiversity areas by Birdlife International (2022) • Datasets prepared by Tilt Renewables: – Project Area – Indicative works area – Disturbance area • Datasets prepared by environmental consultants: – Native vegetation clearing area	• DBCA-011 (Last updated: 18 February 2025) • DBCA-013 (Last updated: 18 September 2017) • DBCA-015 (Last updated: 13 September 2017) • DBCA-019 (Last updated: 12 November 2024) • DBCA-063 (Last updated: 7 August 2019) • DPIRD-005 (19 June 2023) • DPIRD-006 (23 July 2019) • DPIRD-083 (Last updated: 14 March 2022) • DWER-031 (Last updated: 20 June 2018) • Birdlife International 2022 (Last updated: 2022) • Project Area (Last updated: 17 May 2023) • Indicative works area (Last updated: 7 March 2025) • Disturbance area (Last updated: 26 February 2025) • Native vegetation clearing area (Last updated: 13 March 2025)	• Aerial imagery sourced from Landgate were overlaid with Conservation Areas data derived from DBCA (dataset: DBCA-011) • The Project Area, Indicative works area and Disturbance area footprints prepared by Tilt Renewables and the Native vegetation clearing area prepared by RPS were then overlaid on the map • The data from the Hydrography (dataset: DWER-031), Directory of important wetlands in Australia (dataset: DBCA-045), Geomorphic wetlands (dataset: DBCA-013, DBCA-014, DBCA-015 and DBCA-019) and Farm dams (dataset: DPIRD-083) was combined and then overlaid on the map into one feature under the subheading 'Surface water features' • The Key biodiversity areas (dataset: Birdlife International 2022) were then overlaid on the map under the subheading 'Potential Carnaby's cockatoo breeding habitat'. The names of the Carnaby's cockatoo breeding areas were added to the map • Additional potential Carnaby's cockatoo breeding and roosting habitat was identified by intersecting the Native Vegetation Extent (dataset: DPIRD-005) and the Vegetation Association 4, 7 and 999 of the Pre-European Vegetation (dataset: DPIRD-006). These datasets were considered representative of potential Carnaby's cockatoo breeding and roosting habitat for the reasons outlined in Sections 5.3.2.3 and 5.3.2.4. The feature is positioned under the subheading 'Potential Carnaby's cockatoo breeding habitat'

Figure ID	Figure title	Source data or other evidence used	Currency of dataset(s)	Methodology to create figures
Figure 9	Carnaby’s cockatoo potential roosting habitat within 12 km of the Project Area	• Datasets prepared by state government agencies: – Aerial imagery by Landgate – Conservation areas (DBCA-011) by DBCA – DBCA’s Threatened, Specially Protected and Priority Fauna database results (White Tailed Black Cockatoo roosting sites) – Directory of important wetlands in Australia (DBCA-045) and Geomorphic wetlands (DBCA-013, DBCA-015 and DBCA-019) by DBCA – Hydrography Linear (Hierarchy) (DWER-031) by DWER – Farm dams of Western Australia (DPIRD-083) by DPIRD • Datasets prepared by Tilt Renewables: – Project Area – Indicative works area – Disturbance area • Datasets prepared by environmental consultants: – Native vegetation clearing area – Carnaby’s cockatoo roost areas from Carnaby’s Black-Cockatoo and Fork-tailed Swift utilisation survey (BCE 2025) – Carnaby’s cockatoo roosting sites from Murdoch University (2024)	• DBCA’s Threatened, Specially Protected and Priority Fauna database results provided in August 2023 • DBCA-011 (Last updated: 18 February 2025) • DBCA-013 (Last updated: 18 September 2017) • DBCA-015 (Last updated: 13 September 2017) • DBCA-019 (Last updated: 12 November 2024) • DPIRD-083 (Last updated: 14 March 2022) • DWER-031 (Last updated: 20 June 2018) • Project Area (Last updated: 17 May 2023) • Indicative works area (Last updated: 7 March 2025) • Disturbance area (Last updated: 26 February 2025) • Native vegetation clearing area (Last updated: 13 March 2025) • Murdoch University roosting sites (Last updated: 12 June 2024) • BCE 2025 survey data (Last updated: 11 April 2025)	• Aerial imagery sourced from Landgate were overlaid with Conservation Areas data derived from DBCA (dataset: DBCA-011) • The Project Area, Indicative works area and Disturbance area footprints prepared by Tilt Renewables and the Native vegetation clearing area prepared by RPS were then overlaid on the map • The data from the Hydrography (dataset: DWER-031), Directory of important wetlands in Australia (dataset: DBCA-045), Geomorphic wetlands (dataset: DBCA-013, DBCA-015 and DBCA-019) and Farm dams (dataset: DPIRD-083) was combined and then overlaid on the map into one feature under the subheading ‘Surface water features’ • The White Tailed Black Cockatoo roosting sites, based on DBCA’s Threatened, Specially Protected and Priority Fauna database results provided in August 2023, and the roosting sites from Murdoch University (2024) were overlaid on the map under the subheading ‘Known Carnaby’s cockatoo roosting habitat’. Carnaby’s cockatoo roost areas identified by BCE (2025) were also overlaid on the map.

Figure ID	Figure title	Source data or other evidence used	Currency of dataset(s)	Methodology to create figures
Figure 10	Carnaby's cockatoo potential foraging habitat within 12 km of the Project Area	- Datasets prepared by state government agencies: - Aerial imagery by Landgate - Conservation areas (DBCA-011) by DBCA - Directory of important wetlands in Australia (DBCA-045) and Geomorphic wetlands (DBCA-013, DBCA-015 and DBCA-019) by DBCA - Hydrography Linear (Hierarchy) (DWER-031) by DWER - Farm dams of Western Australia (DPIRD-083) by DPIRD - Native Vegetation Extent (DPIRD-005) and Pre-European Vegetation (DPIRD-006) - Datasets prepared by Tilt Renewables: - Project Area - Indicative works area - Disturbance area - Datasets prepared by environmental consultants: - Native vegetation clearing area - Carnaby's cockatoo foraging signs from Carnaby's Black-Cockatoo and Fork-tailed Swift utilisation survey (BCE 2025) - Potential foraging habitat from site inspection (RPS and Tilt Renewables 2023) - Potential foraging habitat from Reconnaissance flora and vegetation assessment, Waddi Wind Farm (RPS 2023) - Potential foraging habitat and tall trees from Black-Cockatoo habitat assessment for the Waddi Wind Farm transmission line alignment and the nominated areas in the adjacent farmland (Terrestrial Ecosystems 2022) - Potential foraging habitat from Waddi Wind Farm proposed action – Cataby Supplementary Flora, Vegetation and Fauna Survey (Ecologia Environment 2016) - Potential foraging habitat from Waddi Wind Farm Spring Flora and Vegetation Survey and Black Cockatoo Habitat Survey (Outback Ecology 2014)	- DBCA-011 (Last updated: 18 February 2025) - DBCA-013 (Last updated: 18 September 2017) - DBCA-015 (Last updated: 13 September 2017) - DBCA-019 (Last updated: 12 November 2024) - DPIRD-005 (19 June 2023) - DPIRD-006 (23 July 2019) - DPIRD-083 (Last updated: 14 March 2022) - DWER-031 (Last updated: 20 June 2018) - Project Area (Last updated: 17 May 2023) - Indicative works area (Last updated: 7 March 2025) - Disturbance area (Last updated: 26 February 2025) - Native vegetation clearing area (Last updated: 13 March 2025) - BCE 2025 survey data (Last updated: 11 April 2025) - RPS and Tilt Renewables 2023 (4 August 2023) - RPS 2023 survey data (Last updated: 2 August 2023) - Terrestrial Ecosystems 2022 survey data (Last updated: 16 December 2022) - Ecologia Environment 2016 survey data (Last updated: 2 November 2016) - Outback Ecology 2014 survey data (Last updated: 28 April 2014)	- Aerial imagery sourced from Landgate were overlaid with Conservation Areas data derived from DBCA (dataset: DBCA-011) - The Project Area, Indicative works area and Disturbance area footprints prepared by Tilt Renewables and the Native vegetation clearing area prepared by RPS were then overlaid on the map - The data from the Hydrography (dataset: DWER-031), Directory of important wetlands in Australia (dataset: DBCA-045), Geomorphic wetlands (dataset: DBCA-013, DBCA-015 and DBCA-019) and Farm dams (dataset: DPIRD-083) was combined and then overlaid on the map into one feature under the subheading 'Surface water features' - All vegetation type mapping of potential Carnaby's cockatoo foraging habitat across all project surveys and a site inspection (RPS and Tilt Renewables 2023, RPS 2023, Terrestrial Ecosystems 2022, Outback Ecology 2014) were then overlaid on the map under the subheading 'Potential Carnaby's cockatoo foraging habitat'. Additional potential Carnaby's cockatoo foraging habitat was identified by intersecting the Native Vegetation Extent (dataset: DPIRD-005) and the Vegetation Association 4, 7, 999, 1030, 1031 and 1035 of the Pre-European Vegetation (dataset: DPIRD-006). These datasets were considered representative of potential Carnaby's cockatoo foraging habitat for the reasons outlined in Section 5.3.2.5. Carnaby's cockatoo foraging signs identified by BCE (2025) and tall trees identified by Terrestrial Ecosystems (2022) were also overlaid on the map.
Figure 11	Flight lines for Carnaby's cockatoo groups showing flight heights and general distribution	- Datasets prepared by state government agencies: - Aerial imagery by Landgate - Datasets prepared by Tilt Renewables: - Project Area - Turbine layout - Datasets prepared by environmental consultants: - Carnaby's cockatoo flight lines from Carnaby's Black-Cockatoo and Fork-tailed Swift utilisation survey (BCE 2025)	- Project Area (Last updated: 17 May 2023) - Turbine layout (Last updated: 13 March 2023) - BCE 2025 survey data (Last updated: 11 April 2025)	- Aerial imagery sourced from Landgate were overlaid on the map - The Project Area footprint and wind turbine locations prepared by Tilt Renewables were then overlaid on the map - The Vantage Point locations sampled by BCE (2025) were overlaid on the map - The flight lines for each group of Carnaby's cockatoos recorded by BCE (2025) showing flight height and general distribution were overlaid on the map, with the symbology adjusted to differentiate between grouped flight heights.
Figure 12	Carnaby's cockatoo flock movement tracks for which Murdoch University has data	- Dataset prepared by state government agency: - Aerial imagery by Landgate - Datasets prepared by Tilt Renewables: - Project Area - Datasets prepared by bird experts: - Carnaby's cockatoo flock movement tracks and tagged bird data from Murdoch University (2024)	- Project Area (Last updated: 17 May 2023) - Murdoch University flock movement tracks (Last updated: 12 June 2024)	- Aerial imagery sourced from Landgate were overlaid on the map - The Project Area footprint prepared by Tilt Renewables was then overlaid on the map - The Carnaby's cockatoo flock movement tracks for which Murdoch University (2024) has data was overlaid on the map. Dot icons were used to identify individually telemetry tagged birds, with the symbology adjusted to differentiate between tagged birds.
Figure 13	Star sun-orchid records within and proximate to the Project Area index	- Datasets prepared by state government agencies: - Aerial imagery by Landgate	DBCA-011 (Last updated: 18 February 2025)	Aerial imagery sourced from Landgate were overlaid with Conservation Areas data derived from DBCA (dataset: DBCA-011)
Figure 14	Star sun-orchid records adjacent to access track near Mullering Road	Conservation areas (DBCA-011) by DBCA		

Figure ID	Figure title	Source data or other evidence used	Currency of dataset(s)	Methodology to create figures
Figure 15	Star sun-orchid records within Waddi Road reserve	– DBCA's Threatened and Priority Flora database results • Datasets prepared by Tilt Renewables: – Project Area – Indicative works area – Disturbance area • Datasets prepared by environmental consultant: – Native vegetation clearing area – Star sun-orchid records from Targeted star sun-orchid and sandplain duck orchid searches (RPS 2025) – Star sun-orchid records from Reconnaissance flora and vegetation assessment, Waddi Wind Farm (RPS 2023)	• DBCA's Threatened and Priority Flora database results provided in August 2022 • Project Area (Last updated: 17 May 2023) • Indicative works area (Last updated: 7 March 2025) • Disturbance area (Last updated: 26 February 2025) • Native vegetation clearing area (Last updated: 13 March 2025) • RPS 2023 survey records (Last updated: 2 August 2023) • RPS 2025 survey records (Last updated: 4 April 2025)	• The Project Area, Indicative works area and Disturbance area footprints prepared by Tilt Renewables and the native vegetation clearing area prepared by RPS were then overlaid on the map • All DBCA records of star sun-orchid based on DBCA's Threatened and Priority Flora database results provided in August 2022 were then overlaid on the map under the subheading 'DBCA Threatened Flora Database Records' with symbology adjusted to differentiate records by species • The combined records of star sun-orchids identified across all project surveys (RPS 2023 and RPS 2025) were then overlaid on the map and combined under the subheading 'Waddi Wind Farm Survey Records (Combined)'. In addition, the GPS buffers from the RPS (2025) survey were overlaid on the map. Separation distance arrows were drawn for the star sun-orchid records located close to the Native Vegetation Clearing Area.
Figure 17	Potential alternative location for the access track and underground cabling	• Datasets prepared by state government agencies: – Aerial imagery and Roads (Simplified) (LGATE-195) by Landgate – 10m contours (DPIRD-073) by DPIRD • Datasets prepared by Tilt Renewables: – Project Area – Indicative works area – Disturbance area – Indicative turbine layout – Potential alternative access – Moodjar trees – Dampier to Bunbury Natural Gas Pipeline • Datasets prepared by environmental consultant: – Potential Carnaby's cockatoo roosting trees from Black-Cockatoo habitat assessment for the Waddi Wind Farm transmission line alignment and the nominated areas in the adjacent farmland (Terrestrial Ecosystems 2022)	• LGATE-195 (Last updated: 14 April 2025) • DPIRD-073 (Last updated: 5 September 2022) • Project Area (Last updated: 17 May 2023) • Indicative works area (Last updated: 7 March 2025) • Disturbance area (Last updated: 26 February 2025) • Turbine layout (Last updated: 13 March 2023) • Potential alternative access, Moodjar trees Dampier to Bunbury Natural Gas Pipeline (Last updated: 15 April 2025) • Terrestrial Ecosystems 2022 survey data (Last updated: 16 December 2022)	• Aerial imagery sourced from Landgate was overlaid on the map with 10m contours derived from DPIRD (dataset: DPIRD-073) and Roads (Simplified) derived from Landgate (dataset: LGATE-195) • The Project Area, Indicative works area and Disturbance area footprints, turbine layout, potential alternative access, Moodjar trees and Dampier to Bunbury Natural Gas Pipeline prepared by Tilt Renewables were then overlaid on the map • The tall trees identified by Terrestrial Ecosystems (2022) as Potential Carnaby's cockatoo roosting trees were also overlaid on the map.
Figure 18	Star sun-orchid environmental control map, adjacent to Waddi Road	• Datasets prepared by state government agencies: – Aerial imagery and cadastre by Landgate • Datasets prepared by Tilt Renewables: – Project Area – Indicative works area – Disturbance area – Silt Sock (or similar) to be deployed during use of water carts – Ring lock fencing and wind break netting – Stabilised Aggregate • Datasets prepared by environmental consultant: – Star sun-orchid records from Targeted star sun-orchid and sandplain duck orchid searches (RPS 2025) – Star sun-orchid records from Reconnaissance flora and vegetation assessment, Waddi Wind Farm (RPS 2023)	• Project Area (Last updated: 17 May 2023) • Indicative works area (Last updated: 7 March 2025) • Disturbance area (Last updated: 26 February 2025) • Silt Sock, Ring lock fencing and Stabilised Aggregate (Last updated: 24 March 2025) • RPS 2023 survey records (Last updated: 2 August 2023) • RPS 2025 survey records (Last updated: 4 April 2025)	• Aerial imagery sourced from Landgate was overlaid on the map • The Project Area, Indicative works area and Disturbance area footprints and Silt Sock, Ring lock fencing and Stabilised Aggregate prepared by Tilt Renewables were then overlaid on the map • The combined records of star sun-orchids identified across all project surveys (RPS 2023 and RPS 2025) were then overlaid on the map
Figure 19	Star sun-orchid environmental control map, adjacent to proposed transmission line	• Datasets prepared by state government agencies: – Aerial imagery and cadastre by Landgate • Datasets prepared by Tilt Renewables: – Project Area – Indicative works area – Disturbance area – Silt Sock (or similar) to be deployed during use of water carts – Ring lock fencing and wind break netting – Stabilised Aggregate • Datasets prepared by environmental consultant: – Star sun-orchid records from Targeted star sun-orchid and sandplain duck orchid searches (RPS 2025) – Star sun-orchid records from Reconnaissance flora and vegetation assessment, Waddi Wind Farm (RPS 2023)	• Project Area (Last updated: 17 May 2023) • Indicative works area (Last updated: 7 March 2025) • Disturbance area (Last updated: 26 February 2025) • Silt Sock, Ring lock fencing and Stabilised Aggregate (Last updated: 24 March 2025) • RPS 2023 survey records (Last updated: 2 August 2023) • RPS 2025 survey records (Last updated: 4 April 2025)	• Aerial imagery sourced from Landgate was overlaid on the map • The Project Area, Indicative works area and Disturbance area footprints and Silt Sock, Ring lock fencing and Stabilised Aggregate prepared by Tilt Renewables were then overlaid on the map • The combined records of star sun-orchids identified across all project surveys (RPS 2023 and RPS 2025) were then overlaid on the map

Compiled at rear of report

Figure ID	Figure title	Source data or other evidence used	Currency of dataset(s)	Methodology to create figures
Figure A	Flora and vegetation survey areas	• Datasets prepared by state government agencies: – Aerial imagery by Landgate – Conservation areas (DBCA-011) by DBCA • Datasets prepared by Tilt Renewables: – Project Area – Indicative works area – Disturbance area • Datasets prepared by environmental consultants: – Native vegetation clearing area – Survey area from Targeted Level 1 Vegetation and Flora Assessment Waddi (Outback Ecology 2010) – Survey area from Waddi Wind Farm Spring Flora and Vegetation Survey and Black Cockatoo Habitat Survey (Outback Ecology 2014) – Survey area from Waddi Wind Farm proposed action – Cataby Supplementary Flora, Vegetation and Fauna Survey (Ecologia Environment 2016) – Survey area from Reconnaissance flora and vegetation assessment, Waddi Wind Farm (RPS 2023) – Survey area from Targeted star sun-orchid and sandplain duck orchid searches (RPS 2025)	• DBCA-011 (Last updated: 18 February 2025) • Project Area (Last updated: 17 May 2023) • Indicative works area (Last updated: 7 March 2025) • Disturbance area (Last updated: 26 February 2025) • Native vegetation clearing area (Last updated: 13 March 2025) • Outback Ecology 2010 Survey Area (Last updated: 11 March 2010) • Outback Ecology 2014 Survey Area (Last updated: 28 April 2014) • Ecologia Environment 2016 Survey Area (Last updated: 2 November 2016) • RPS 2023 Survey Area (Last updated: 2 August 2023) • RPS 2025 Survey Area (Last updated: 14 November 2024)	• Aerial imagery sourced from Landgate were overlaid with Conservation Areas data derived from DBCA (dataset: DBCA-011) • The Project Area, Indicative works area and Disturbance area footprints prepared by Tilt Renewables and the Native vegetation clearing area prepared by RPS were then overlaid on the map • Shapefiles of the areas of all previous flora and vegetation surveys undertaken for the project were then overlaid on the map and symbology adjusted to differentiate between each survey
Figure B	EPBC Act listed Threatened flora species	• Datasets prepared by state government agencies: – Aerial imagery by Landgate – Conservation areas (DBCA-011) by DBCA – DBCA's Threatened and Priority Flora database results • Datasets prepared by Tilt Renewables: – Project Area – Indicative works area – Disturbance area • Datasets prepared by environmental consultant: – Native vegetation clearing area – EPBC Act listed flora records from Reconnaissance flora and vegetation assessment, Waddi Wind Farm (RPS 2023) – EPBC Act listed flora records from Targeted star sun-orchid and sandplain duck orchid searches (RPS 2025)	• DBCA-011 (Last updated: 18 February 2025) • DBCA's Threatened and Priority Flora database results provided in August 2022 • Project Area (Last updated: 17 May 2023) • Indicative works area (Last updated: 7 March 2025) • Disturbance area (Last updated: 26 February 2025) • Native vegetation clearing area (Last updated: 13 March 2025) • RPS 2023 Survey Records (Last updated: 2 August 2023) • RPS 2025 Survey Records (Last updated: 4 April 2025)	• Aerial imagery sourced from Landgate were overlaid with Conservation Areas data derived from DBCA (dataset: DBCA-011) • The Project Area, Indicative works area and Disturbance area footprints prepared by Tilt Renewables and the Native vegetation clearing area prepared by RPS were then overlaid on the map • All DBCA records of EPBC Act listed threatened flora based on DBCA's Threatened and Priority Flora database results provided in August 2022 were then overlaid on the map under the subheading 'DBCA Threatened Flora Database Records' with symbology adjusted to differentiate records by species • The combined records of EPBC Act listed threatened flora identified across all project surveys (RPS 2023 and RPS 2025) were then overlaid on the map and combined under the subheading 'Waddi Wind Farm Survey Records (Combined)' with symbology adjusted by number of records in each surveyed location

Figure ID	Figure title	Source data or other evidence used	Currency of dataset(s)	Methodology to create figures
Figure C	Star sun-orchid habitat	- Datasets prepared by state government agencies: - Aerial imagery by Landgate - Conservation areas (DBCA-011) by DBCA - DBCA's Threatened and Priority Flora database results - Native Vegetation Extent (DPIRD-005) and Pre-European Vegetation (DPIRD-006) - Datasets prepared by Tilt Renewables: - Project Area - Indicative works area - Disturbance area - Datasets prepared by environmental consultant: - Native vegetation clearing area - Star sun-orchid records from Targeted star sun-orchid and sandplain duck orchid searches (RPS 2025) - Star sun-orchid records and vegetation type mapping from Reconnaissance flora and vegetation assessment, Waddi Wind Farm (RPS 2023) - Vegetation type mapping from Waddi Wind Farm Spring Flora and Vegetation Survey and Black Cockatoo Habitat Survey (Outback Ecology 2014)	- DBCA-011 (Last updated: 18 February 2025) - DBCA's Threatened and Priority Flora database results provided in August 2022 - DPIRD-005 (19 June 2023) - DPIRD-006 (23 July 2019) - Project Area (Last updated: 17 May 2023) - Indicative works area (Last updated: 7 March 2025) - Disturbance area (Last updated: 26 February 2025) - Native vegetation clearing area (Last updated: 13 March 2025) - Outback Ecology 2014 vegetation type mapping (Last updated: 28 April 2014) - RPS 2023 survey records and vegetation type mapping (Last updated: 2 August 2023) - RPS 2025 survey records (Last updated: 4 April 2025)	- Aerial imagery sourced from Landgate were overlaid with Conservation Areas data derived from DBCA (dataset: DBCA-011) - The Project Area, Indicative works area and Disturbance area footprints prepared by Tilt Renewables and the native vegetation clearing area prepared by RPS were then overlaid on the map - All vegetation type mapping of proteaceous heath across all project surveys (RPS 2023, Outback Ecology 2014) were then overlaid on the map under the subheading 'Potential star sun orchid habitat'. Additional potential habitat was identified by intersecting the Native Vegetation Extent (dataset: DPIRD-005) and the Vegetation Association 1031 of the Pre-European Vegetation (dataset: DPIRD-006). These datasets were considered representative of potential star sun-orchid habitat for the reasons outlined in Section 5.4.2.4 - All DBCA records of star sun-orchid based on DBCA's Threatened and Priority Flora database results provided in August 2022 were then overlaid on the map under the subheading 'DBCA Threatened Flora Database Records' with symbology adjusted to differentiate records by species - The combined records of star sun-orchids identified across all project surveys (RPS 2023 and RPS 2025) were then overlaid on the map and combined under the subheading 'Waddi Wind Farm Survey Records (Combined)'
Figure D	Dwarf green kangaroo paw	- Datasets prepared by state government agencies: - Aerial imagery by Landgate - Conservation areas (DBCA-011) by DBCA - DBCA's Threatened and Priority Flora database results - Native Vegetation Extent (DPIRD-005) and Pre-European Vegetation (DPIRD-006) - Datasets prepared by Tilt Renewables: - Project Area - Indicative works area - Disturbance area - Datasets prepared by environmental consultant: - Native vegetation clearing area - Dwarf green kangaroo paw record and vegetation type mapping from Reconnaissance flora and vegetation assessment, Waddi Wind Farm (RPS 2023) - Vegetation type mapping from Waddi Wind Farm proposed action – Cataby Supplementary Flora, Vegetation and Fauna Survey (Ecologia Environment 2016)	- DBCA-011 (Last updated: 18 February 2025) - DBCA's Threatened and Priority Flora database results provided in August 2022 - DPIRD-005 (19 June 2023) - DPIRD-006 (23 July 2019) - Project Area (Last updated: 17 May 2023) - Indicative works area (Last updated: 7 March 2025) - Disturbance area (Last updated: 26 February 2025) - Native vegetation clearing area (Last updated: 13 March 2025) - Ecologia Environment 2016 vegetation type mapping (Last updated: 2 November 2016) - RPS 2023 survey records and vegetation type mapping (Last updated: 2 August 2023)	- Aerial imagery sourced from Landgate were overlaid with Conservation Areas data derived from DBCA (dataset: DBCA-011) - The Project Area, Indicative works area and Disturbance area footprints prepared by Tilt Renewables and the native vegetation clearing area prepared by RPS were then overlaid on the map - All vegetation type mapping of banksia low open woodland across all project surveys (RPS 2023, Ecologia Environment 2016) were then overlaid on the map under the subheading 'Potential dwarf green kangaroo paw habitat'. Additional potential habitat was identified by intersecting the Native Vegetation Extent (dataset: DPIRD-005) and the Vegetation Association 1030 of the Pre-European Vegetation (dataset: DPIRD-006). These datasets were considered representative of potential dwarf green kangaroo paw habitat for the reasons outlined in Section 5.4.3.3 - All DBCA records of dwarf green kangaroo paw based on DBCA's Threatened and Priority Flora database results provided in August 2022 were then overlaid on the map under the subheading 'DBCA Threatened Flora Database Records' with symbology adjusted to differentiate records by species - The record of dwarf green kangaroo paw identified across all project surveys (RPS 2023) were then overlaid on the map and combined under the subheading 'Waddi Wind Farm Survey Records (Combined)'

Figure ID	Figure title	Source data or other evidence used	Currency of dataset(s)	Methodology to create figures
Figure E	Lesueur hakea habitat	• Datasets prepared by state government agencies: – Aerial imagery by Landgate – Conservation areas (DBCA-011) by DBCA – DBCA's Threatened and Priority Flora database results – Native Vegetation Extent (DPIRD-005) and Pre-European Vegetation (DPIRD-006) • Datasets prepared by Tilt Renewables: – Project Area – Indicative works area – Disturbance area • Datasets prepared by environmental consultant: – Native vegetation clearing area – Lesueur Hakea records and vegetation types from Reconnaissance flora and vegetation assessment, Waddi Wind Farm (RPS 2023) – Vegetation type mapping from Waddi Wind Farm Spring Flora and Vegetation Survey and Black Cockatoo Habitat Survey (Outback Ecology 2014)	• DBCA-011 (Last updated: 18 February 2025) • DBCA's Threatened and Priority Flora database results provided in August 2022 • DPIRD-005 (19 June 2023) • DPIRD-006 (23 July 2019) • Project Area (Last updated: 17 May 2023) • Indicative works area (Last updated: 7 March 2025) • Disturbance area (Last updated: 26 February 2025) • Native vegetation clearing area (Last updated: 13 March 2025) • Outback Ecology 2014 vegetation type mapping (Last updated: 28 April 2014) • RPS 2023 survey records and vegetation type mapping (Last updated: 2 August 2023)	• Aerial imagery sourced from Landgate were overlaid with Conservation Areas data derived from DBCA (dataset: DBCA-011) • The Project Area, Indicative works area and Disturbance area footprints prepared by Tilt Renewables and the native vegetation clearing area prepared by RPS were then overlaid on the map. • All vegetation type mapping of proteaceous heath across all project surveys (RPS 2023, Outback Ecology 2014) were then overlaid on the map under the subheading 'Potential Lesueur hakea habitat'. Additional potential habitat was identified by intersecting the Native Vegetation Extent (dataset: DPIRD-005) and the Vegetation Association 1031 of the Pre-European Vegetation (dataset: DPIRD-006). These datasets were considered representative of potential Lesueur hakea habitat for the reasons outlined in Section 5.4.4.3. • All DBCA records of Lesueur hakea based on DBCA's Threatened and Priority Flora database results provided in August 2022 were then overlaid on the map under the subheading 'DBCA Threatened Flora Database Records' with symbology adjusted to differentiate records by species. • The record of Lesueur hakeas identified across all project surveys (RPS 2023) were then overlaid on the map and combined under the subheading 'Waddi Wind Farm Survey Records (Combined)'.
Figure F	Sandplain duck orchid habitat	• Datasets prepared by state government agencies: – Aerial imagery by Landgate – Conservation areas (DBCA-011) by DBCA – DBCA's Threatened and Priority Flora database results – Native Vegetation Extent (DPIRD-005) and Pre-European Vegetation (DPIRD-006) • Datasets prepared by Tilt Renewables: – Project Area – Indicative works area – Disturbance area • Datasets prepared by environmental consultant: – Native vegetation clearing area – Vegetation type mapping from Reconnaissance flora and vegetation assessment, Waddi Wind Farm (RPS 2023) – Vegetation type mapping from Waddi Wind Farm Spring Flora and Vegetation Survey and Black Cockatoo Habitat Survey (Outback Ecology 2014)	• DBCA-011 (Last updated: 18 February 2025) • DBCA's Threatened and Priority Flora database results provided in August 2022 • DPIRD-005 (19 June 2023) • DPIRD-006 (23 July 2019) • Project Area (Last updated: 17 May 2023) • Indicative works area (Last updated: 7 March 2025) • Disturbance area (Last updated: 26 February 2025) • Native vegetation clearing area (Last updated: 13 March 2025) • Outback Ecology 2014 vegetation type mapping (Last updated: 28 April 2014) • RPS 2023 vegetation type mapping (Last updated: 2 August 2023)	• Aerial imagery sourced from Landgate were overlaid with Conservation Areas data derived from DBCA (dataset: DBCA-011) • The Project Area, Indicative works area and Disturbance area footprints prepared by Tilt Renewables and the native vegetation clearing area prepared by RPS were then overlaid on the map. • All vegetation type mapping of proteaceous heath across all project surveys (RPS 2023, Outback Ecology 2014) were then overlaid on the map under the subheading 'Potential sandplain duck orchid habitat'. Additional potential habitat was identified by intersecting the Native Vegetation Extent (dataset: DPIRD-005) and the Vegetation Association 1031 of the Pre-European Vegetation (dataset: DPIRD-006). These datasets were considered representative of potential sandplain duck orchid habitat for the reasons outlined in Section 5.4.5.3 • All DBCA records of sandplain duck orchid based on DBCA's Threatened and Priority Flora database results provided in August 2022 were then overlaid on the map under the subheading 'DBCA Threatened Flora Database Records' with symbology adjusted to differentiate records by species.

Figure ID	Figure title	Source data or other evidence used	Currency of dataset(s)	Methodology to create figures
Figure G	Vegetation types	• Datasets prepared by state government agencies: – Aerial imagery by Landgate – Conservation areas (DBCA-011) by DBCA • Datasets prepared by Tilt Renewables: – Project Area – Indicative works area – Disturbance area • Datasets prepared by environmental consultant: – Native vegetation clearing area – Vegetation type mapping from Reconnaissance flora and vegetation assessment, Waddi Wind Farm (RPS 2023) – Vegetation type mapping from Waddi Wind Farm proposed action – Cataby Supplementary Flora, Vegetation and Fauna Survey (Ecologia Environment 2016) – Vegetation type mapping from Waddi Wind Farm Spring Flora and Vegetation Survey and Black Cockatoo Habitat Survey (Outback Ecology 2014)	• DBCA-011 (Last updated: 18 February 2025) • Project Area (Last updated: 17 May 2023) • Indicative works area (Last updated: 7 March 2025) • Disturbance area (Last updated: 26 February 2025) • Native vegetation clearing area (Last updated: 13 March 2025) • Ecologia Environment 2016 vegetation type mapping (Last updated: 2 November 2016) • Outback Ecology 2014 vegetation type mapping (Last updated: 28 April 2014) • RPS 2023 vegetation type mapping (Last updated: 2 August 2023)	• Aerial imagery sourced from Landgate were overlaid with Conservation Areas data derived from DBCA (dataset: DBCA-011) • The Project Area, Indicative works area and Disturbance area footprints prepared by Tilt Renewables and the native vegetation clearing area prepared by RPS were then overlaid on the map • All vegetation type mapping across all project surveys (RPS 2023, Ecologia Environment 2016, Outback Ecology 2014) were then overlaid on the map under the subheading ‘Waddi Wind Farm Survey Records (Combined)’
Figure H	Vegetation condition	• Datasets prepared by state government agencies: – Aerial imagery by Landgate – Conservation areas (DBCA-011) by DBCA • Datasets prepared by Tilt Renewables: – Project Area – Indicative works area – Disturbance area • Datasets prepared by environmental consultant: – Native vegetation clearing area – Vegetation condition mapping from Reconnaissance flora and vegetation assessment, Waddi Wind Farm (RPS 2023) – Vegetation condition mapping from Waddi Wind Farm proposed action – Cataby Supplementary Flora, Vegetation and Fauna Survey (Ecologia Environment 2016) – Vegetation condition mapping from Waddi Wind Farm Spring Flora and Vegetation Survey and Black Cockatoo Habitat Survey (Outback Ecology 2014)	• DBCA-011 (Last updated: 18 February 2025) • Project Area (Last updated: 17 May 2023) • Indicative works area (Last updated: 7 March 2025) • Disturbance area (Last updated: 26 February 2025) • Native vegetation clearing area (Last updated: 13 March 2025) • Ecologia Environment 2016 vegetation condition mapping (Last updated: 2 November 2016) • Outback Ecology 2014 vegetation condition mapping (Last updated: 28 April 2014) • RPS 2023 vegetation condition mapping (Last updated: 2 August 2023)	• Aerial imagery sourced from Landgate were overlaid with Conservation Areas data derived from DBCA (dataset: DBCA-011) • The Project Area, Indicative works area and Disturbance area footprints prepared by Tilt Renewables and the native vegetation clearing area prepared by RPS were then overlaid on the map • All vegetation condition mapping across all project surveys (RPS 2023, Ecologia Environment 2016, Outback Ecology 2014) were then overlaid on the map under the subheading ‘Waddi Wind Farm Survey Records (Combined)’

Figure ID	Figure title	Source data or other evidence used	Currency of dataset(s)	Methodology to create figures
Figure I	Banksia Woodlands of the Swan Coastal Plain Threatened Ecological Community	- Datasets prepared by state government agencies: - Aerial imagery by Landgate - Conservation areas (DBCA-011) by DBCA - DBCA's Threatened and Priority Ecological Communities database results - IBRA bioregions - Datasets prepared by Tilt Renewables: - Project Area - Indicative works area - Disturbance area - Datasets prepared by environmental consultants: - Native vegetation clearing area - Banksia Woodlands of the Swan Coastal Plain Threatened Ecological Community representative vegetation types from Waddi Wind Farm Spring Flora and Vegetation Survey and Black Cockatoo Habitat Survey (Outback Ecology 2014) - Banksia Woodlands of the Swan Coastal Plain Threatened Ecological Community representative vegetation types from Waddi Wind Farm proposed action – Cataby Supplementary Flora, Vegetation and Fauna Survey (Ecologia Environment 2016) - Banksia Woodlands of the Swan Coastal Plain Threatened Ecological Community representative vegetation types from Reconnaissance flora and vegetation assessment, Waddi Wind Farm (RPS 2023)	- DBCA-011 (Last updated: 18 February 2025) - DBCA's Threatened and Priority Ecological Communities database results provided in August 2022 - Project Area (Last updated: 17 May 2023) - Indicative works area (Last updated: 7 March 2025) - Disturbance area (Last updated: 26 February 2025) - Native vegetation clearing area (Last updated: 13 March 2025) - Ecologia Environment 2016 vegetation type mapping (Last updated: 2 November 2016) - Outback Ecology 2014 vegetation type mapping (Last updated: 28 April 2014) - RPS 2023 vegetation type mapping (Last updated: 2 August 2023)	- Aerial imagery sourced from Landgate were overlaid with Conservation Areas data derived from DBCA (dataset: DBCA-011) and - The Project Area, Indicative works area and Disturbance area footprints prepared by Tilt Renewables and the native vegetation clearing area prepared by RPS were then overlaid on the map. - Boundaries of the Geraldton Sandplains and Swan Coastal Plain IBRA bioregions were then overlaid on the map. - All DBCA records of EPBC Act listed Banksia Woodlands of the Swan Coastal Plain Threatened Ecological Community based on DBCA's Threatened and Priority Ecological Communities database results provided in August 2022 were then overlaid on the map. - All banksia low open woodland vegetation type mapping across all project surveys (RPS 2023, Ecologia Environment 2016, Outback Ecology 2014) were then overlaid on the map under the subheading 'Waddi Wind Farm Survey Records (Combined)'. An approximation of the Banksia Woodlands of the Swan Coastal Plain Threatened Ecological Community extent within the surveyed vegetation was created by intersecting the banksia low open woodland vegetation type mapping (RPS 2023, Ecologia Environment 2016, Outback Ecology 2013) and the Swan Coastal Plain IBRA bioregion.
Figure J	Fauna survey areas	- Datasets prepared by state government agencies: - Aerial imagery by Landgate - Conservation areas (DBCA-011) by DBCA - Datasets prepared by Tilt Renewables: - Project Area - Indicative works area - Disturbance area - Datasets prepared by environmental consultants: - Native vegetation clearing area - Survey area from Avifauna Assessment Proposed Wind Farm Development Dandaragan Shire (RPS 2010) - Survey area from Waddi Wind Farm Spring Flora and Vegetation Survey and Black Cockatoo Habitat Survey (Outback Ecology 2014) - Survey area from Waddi Wind Farm proposed action – Cataby Supplementary Flora, Vegetation and Fauna Survey (Ecologia Environment 2016) - Survey area from Black-Cockatoo habitat assessment for the Waddi Wind Farm transmission line alignment and the nominated areas in the adjacent farmland (Terrestrial Ecosystems 2022) - Survey area from Carnaby's Black-Cockatoo and Fork-tailed Swift utilisation survey (BCE 2025)	- DBCA-011 (Last updated: 18 February 2025) - Project Area (Last updated: 17 May 2023) - Indicative works area (Last updated: 7 March 2025) - Disturbance area (Last updated: 26 February 2025) - Native vegetation clearing area (Last updated: 13 March 2025) - RPS 2010 survey area (Last updated: 2 November 2010) - Outback Ecology 2014 survey area (Last updated: 28 April 2014) - Ecologia Environment 2016 survey area (Last updated: 2 November 2016) - Terrestrial Ecosystems 2022 survey area (Last updated: 16 December 2022) - BCE 2025 survey area (Last updated: 11 April 2025)	- Aerial imagery sourced from Landgate were overlaid with Conservation Areas data derived from DBCA (dataset: DBCA-011) - The Project Area, Indicative works area and Disturbance area footprints prepared by Tilt Renewables and the Native vegetation clearing area prepared by RPS were then overlaid on the map - Shapefiles of the areas of all previous fauna surveys for the project were then overlaid on the map and symbology adjusted to differentiate between each survey

Figure ID	Figure title	Source data or other evidence used	Currency of dataset(s)	Methodology to create figures
Figure K	Migrating wader habitat	- Datasets prepared by state government agencies: - Aerial imagery by Landgate - Conservation areas (DBCA-011) by DBCA - DBCA's Threatened, Specially Protected and Priority Fauna database results - Directory of important wetlands in Australia (DBCA-045) and Geomorphic wetlands (DBCA-013, DBCA-015 and DBCA-019) by DBCA - Hydrography Linear (Hierarchy) (DWER-031) by DWER - Farm dams of Western Australia (DPIRD-083) by DPIRD - Datasets prepared by Tilt Renewables: - Project Area - Indicative works area - Disturbance area - Datasets prepared by environmental consultants: - Native vegetation clearing area	- DBCA-011 (Last updated: 18 February 2025) - DBCA's Threatened, Specially Protected and Priority Fauna database results provided in August 2023 - DBCA-013 (Last updated: 18 September 2017) - DBCA-015 (Last updated: 13 September 2017) - DBCA-019 (Last updated: 12 November 2024) - DBCA-045 (Last updated: 27 April 2018) - DPIRD-083 (Last updated: 14 March 2022) - DWER-031 (Last updated: 20 June 2018) - Project Area (Last updated: 17 May 2023) - Indicative works area (Last updated: 7 March 2025) - Disturbance area (Last updated: 26 February 2025) - Native vegetation clearing area (Last updated: 13 March 2025)	- Aerial imagery sourced from Landgate were overlaid with Conservation Areas data derived from DBCA (dataset: DBCA-011) - The Project Area, Indicative works area and Disturbance area footprints prepared by Tilt Renewables and the Native vegetation clearing area prepared by RPS were then overlaid on the map - The data from the Hydrography (dataset: DWER-031), Directory of important wetlands in Australia (dataset: DBCA-045), Geomorphic wetlands (dataset: DBCA-013, DBCA-015 and DBCA-019) and Farm dams (dataset: DPIRD-083) was combined and then overlaid on the map into one feature under the subheading 'Surface water features'. - Potential habitat for migratory wader species was identified by combining the Directory of important wetlands in Australia (dataset: DBCA-045) and Geomorphic wetlands (dataset: DBCA-013, DBCA-015 and DBCA-019) under the subheading 'Potential migratory wader habitat'. These datasets were considered representative of potential migratory wader habitat for the reasons outlined in Section 5.2.1 - The visible DBCA record of an EPBC Act listed fauna species based on DBCA's Threatened, Specially Protected and Priority Fauna database results provided in August 2023 was then overlaid on the map.
Figure L	Fork-tailed swift habitat	- Datasets prepared by state government agencies: - Aerial imagery by Landgate - Conservation areas (DBCA-011) by DBCA - Directory of important wetlands in Australia (DBCA-045) and Geomorphic wetlands (DBCA-013, DBCA-015 and DBCA-019) by DBCA - Hydrography Linear (Hierarchy) (DWER-031) by DWER - Farm dams of Western Australia (DPIRD-083) by DPIRD - Datasets prepared by Tilt Renewables: - Project Area - Indicative works area - Disturbance area - Datasets prepared by environmental consultants: - Native vegetation clearing area	- DBCA-011 (Last updated: 18 February 2025) - DBCA-013 (Last updated: 18 September 2017) - DBCA-015 (Last updated: 13 September 2017) - DBCA-019 (Last updated: 12 November 2024) - DBCA-045 (Last updated: 27 April 2018) - DPIRD-083 (Last updated: 14 March 2022) - DWER-031 (Last updated: 20 June 2018) - Project Area (Last updated: 17 May 2023) - Indicative works area (Last updated: 7 March 2025) - Disturbance area (Last updated: 26 February 2025) - Native vegetation clearing area (Last updated: 13 March 2025)	- Aerial imagery sourced from Landgate were overlaid with Conservation Areas data derived from DBCA (dataset: DBCA-011) - The Project Area, Indicative works area and Disturbance area footprints prepared by Tilt Renewables and the Native vegetation clearing area prepared by RPS were then overlaid on the map - The data from the Hydrography (dataset: DWER-031), Directory of important wetlands in Australia (dataset: DBCA-045), Geomorphic wetlands (dataset: DBCA-013, DBCA-015 and DBCA-019) and Farm dams (dataset: DPIRD-083) was combined and then overlaid on the map into one feature under the subheading 'Surface water features'. - Potential habitat for fork-tailed swift was identified by the mapping from the DCCEEW's Protected Matters Search Tool report (Appendix S) under the subheading 'Potential fork-tailed swift habitat'. This data was considered representative of potential fork-tailed swift habitat for the reasons outlined in Section 5.2.2

Figure ID	Figure title	Source data or other evidence used	Currency of dataset(s)	Methodology to create figures
Figure M	Carnaby’s cockatoo occurrence records	• Datasets prepared by state government agencies: – Aerial imagery by Landgate – Conservation areas (DBCA-011) by DBCA – DBCA’s Threatened, Specially Protected and Priority Fauna database results – Directory of important wetlands in Australia (DBCA-045) and Geomorphic wetlands (DBCA-013, DBCA-015 and DBCA-019) by DBCA – Hydrography Linear (Hierarchy) (DWER-031) by DWER – Farm dams of Western Australia (DPIRD-083) by DPIRD • Datasets prepared by Tilt Renewables: – Project Area – Indicative works area – Disturbance area • Datasets prepared by environmental consultants: – Native vegetation clearing area – Carnaby’s cockatoo features and group observations from Carnaby’s Black-Cockatoo and Fork-tailed Swift utilisation survey (BCE 2025)	• DBCA’s Threatened, Specially Protected and Priority Fauna database results provided in August 2023 • DBCA-011 (Last updated: 18 February 2025) • DBCA-013 (Last updated: 18 September 2017) • DBCA-015 (Last updated: 13 September 2017) • DBCA-019 (Last updated: 12 November 2024) • DBCA-045 (Last updated: 27 April 2018) • DPIRD-083 (Last updated: 14 March 2022) • DWER-031 (Last updated: 20 June 2018) • Project Area (Last updated: 17 May 2023) • Indicative works area (Last updated: 7 March 2025) • Disturbance area (Last updated: 26 February 2025) • Native vegetation clearing area (Last updated: 13 March 2025) • BCE 2025 survey data (Last updated: 11 April 2025)	• Aerial imagery sourced from Landgate were overlaid with Conservation Areas data derived from DBCA (dataset: DBCA-011) • The Project Area, Indicative works area and Disturbance area footprints prepared by Tilt Renewables and the Native vegetation clearing area prepared by RPS were then overlaid on the map • The data from the Hydrography (dataset: DWER-031), Directory of important wetlands in Australia (dataset: DBCA-045), Geomorphic wetlands (dataset: DBCA-013, DBCA-015 and DBCA-019) and Farm dams (dataset: DPIRD-083) was combined and then overlaid on the map into one feature under the subheading ‘Surface water features’. • The DBCA records of Carnaby’s cockatoo based on DBCA’s Threatened, Specially Protected and Priority Fauna database results provided in August 2023 were then overlaid on the map under the subheading ‘Carnaby’s cockatoo occurrence records’. Carnaby’s cockatoo features and group observations by BCE (2025) were also overlaid on the map, with the symbology adjusted to differentiate between differently sized groups.

Figure ID	Figure title	Source data or other evidence used	Currency of dataset(s)	Methodology to create figures
Figure N	Carnaby's cockatoo breeding and roosting habitat	• Datasets prepared by state government agencies: – Aerial imagery by Landgate – Conservation areas (DBCA-011) and Black Cockatoo breeding sites - buffered (DBCA-063) by DBCA – DBCA's Threatened, Specially Protected and Priority Fauna database results (White Tailed Black Cockatoo roosting sites, White Tailed Black Cockatoo breeding site locations) – Directory of important wetlands in Australia (DBCA-045) and Geomorphic wetlands (DBCA-013, DBCA-015 and DBCA-019) by DBCA – Hydrography Linear (Hierarchy) (DWER-031) by DWER – Farm dams of Western Australia (DPIRD-083) by DPIRD – Native Vegetation Extent (DPIRD-005) and Pre-European Vegetation (DPIRD-006) • Datasets prepared by bird experts: – Key biodiversity areas by Birdlife International (2022) – Carnaby's cockatoo roosting sites from Murdoch University (2024) • Datasets prepared by Tilt Renewables: – Project Area – Indicative works area – Disturbance area • Datasets prepared by environmental consultants: – Native vegetation clearing area – Carnaby's cockatoo nesting tree, potential nesting trees and roost areas from Carnaby's Black-Cockatoo and Fork-tailed Swift utilisation survey (BCE 2025) – Tall trees from Black-Cockatoo habitat assessment for the Waddi Wind Farm transmission line alignment and the nominated areas in the adjacent farmland (Terrestrial Ecosystems 2022)	• DBCA's Threatened, Specially Protected and Priority Fauna database results provided in August 2023 • DBCA-011 (Last updated: 18 February 2025) • DBCA-013 (Last updated: 18 September 2017) • DBCA-015 (Last updated: 13 September 2017) • DBCA-019 (Last updated: 12 November 2024) • DBCA-063 (Last updated: 7 August 2019) • DPIRD-005 (19 June 2023) • DPIRD-006 (23 July 2019) • DPIRD-083 (Last updated: 14 March 2022) • DWER-031 (Last updated: 20 June 2018) • Birdlife International 2022 (Last updated: 2022) • Project Area (Last updated: 17 May 2023) • Indicative works area (Last updated: 7 March 2025) • Disturbance area (Last updated: 26 February 2025) • Native vegetation clearing area (Last updated: 13 March 2025) • Terrestrial Ecosystems 2022 survey area (Last updated: 16 December 2022) • Murdoch University roosting sites (Last updated: 12 June 2024) • BCE 2025 survey data (Last updated: 11 April 2025)	• Aerial imagery sourced from Landgate were overlaid with Conservation Areas data derived from DBCA (dataset: DBCA-011) • The Project Area, Indicative works area and Disturbance area footprints prepared by Tilt Renewables and the Native vegetation clearing area prepared by RPS were then overlaid on the map • The data from the Hydrography (dataset: DWER-031), Directory of important wetlands in Australia (dataset: DBCA-045), Geomorphic wetlands (dataset: DBCA-013, DBCA-015 and DBCA-019) and Farm dams (dataset: DPIRD-083) was combined and then overlaid on the map into one feature under the subheading 'Surface water features' • The White Tailed Black Cockatoo confirmed breeding site locations, based on DBCA's Threatened, Specially Protected and Priority Fauna database results provided in August 2023, the buffered Black Cockatoo breeding sites (dataset: DBCA-063) and the Key biodiversity areas (dataset: Birdlife International 2022), were then overlaid on the map under the subheading 'Known Carnaby's cockatoo breeding habitat'. The Carnaby's cockatoo nesting tree identified by BCE (2025) was also overlaid on the map • Potential Carnaby's cockatoo breeding and roosting habitat was identified by intersecting the Native Vegetation Extent (dataset: DPIRD-005) and the Vegetation Association 4, 7 and 999 of the Pre-European Vegetation (dataset: DPIRD-006). These datasets were considered representative of potential Carnaby's cockatoo breeding and roosting habitat for the reasons outlined in Sections 5.3.2.3 and 5.3.2.4. The feature is positioned under the subheading 'Potential Carnaby's cockatoo breeding habitat'. The Carnaby's cockatoo potential nesting trees identified by BCE (2025), the marri trees identified by Terrestrial Ecosystems (2022), and the White Tailed Black Cockatoo potential breeding site locations, based on DBCA's Threatened, Specially Protected and Priority Fauna database results provided in August 2023, were also overlaid on the map. • The White Tailed Black Cockatoo roosting sites, based on DBCA's Threatened, Specially Protected and Priority Fauna database results provided in August 2023, and the roosting sites from Murdoch University (2024) were overlaid on the map under the subheading 'Known Carnaby's cockatoo roosting habitat'. Carnaby's cockatoo roost areas identified by BCE (2025) were also overlaid on the map. • The tall trees identified by Terrestrial Ecosystems (2022) were also overlaid on the map under the subheading 'Potential Carnaby's cockatoo roosting habitat'. Close-up insert images were included where the tall trees were located in the Disturbance Area.

Figure ID	Figure title	Source data or other evidence used	Currency of dataset(s)	Methodology to create figures
Figure O	Carnaby's cockatoo foraging habitat	- Datasets prepared by state government agencies: - Aerial imagery by Landgate - Conservation areas (DBCA-011) by DBCA - Directory of important wetlands in Australia (DBCA-045) and Geomorphic wetlands (DBCA-013, DBCA-015 and DBCA-019) by DBCA - Hydrography Linear (Hierarchy) (DWER-031) by DWER - Farm dams of Western Australia (DPIRD-083) by DPIRD - Native Vegetation Extent (DPIRD-005) and Pre-European Vegetation (DPIRD-006) - Datasets prepared by Tilt Renewables: - Project Area - Indicative works area - Disturbance area - Datasets prepared by environmental consultants: - Native vegetation clearing area - Carnaby's cockatoo foraging signs from Carnaby's Black-Cockatoo and Fork-tailed Swift utilisation survey (BCE 2025) - Potential foraging habitat from site inspection (RPS and Tilt Renewables 2023) - Potential foraging habitat from Reconnaissance flora and vegetation assessment, Waddi Wind Farm (RPS 2023) - Potential foraging habitat and tall trees from Black-Cockatoo habitat assessment for the Waddi Wind Farm transmission line alignment and the nominated areas in the adjacent farmland (Terrestrial Ecosystems 2022) - Potential foraging habitat from Waddi Wind Farm proposed action – Cataby Supplementary Flora, Vegetation and Fauna Survey (Ecologia Environment 2016) - Potential foraging habitat from Waddi Wind Farm Spring Flora and Vegetation Survey and Black Cockatoo Habitat Survey (Outback Ecology 2014)	- DBCA-011 (Last updated: 18 February 2025) - DBCA-013 (Last updated: 18 September 2017) - DBCA-015 (Last updated: 13 September 2017) - DBCA-019 (Last updated: 12 November 2024) - DPIRD-005 (19 June 2023) - DPIRD-006 (23 July 2019) - DPIRD-083 (Last updated: 14 March 2022) - DWER-031 (Last updated: 20 June 2018) - Project Area (Last updated: 17 May 2023) - Indicative works area (Last updated: 7 March 2025) - Disturbance area (Last updated: 26 February 2025) - Native vegetation clearing area (Last updated: 13 March 2025) - BCE 2025 survey data (Last updated: 11 April 2025) - RPS and Tilt Renewables 2023 (4 August 2023) - RPS 2023 survey data (Last updated: 2 August 2023) - Terrestrial Ecosystems 2022 survey data (Last updated: 16 December 2022) - Ecologia Environment 2016 survey data (Last updated: 2 November 2016) - Outback Ecology 2014 survey data (Last updated: 28 April 2014)	- Aerial imagery sourced from Landgate were overlaid with Conservation Areas data derived from DBCA (dataset: DBCA-011) - The Project Area, Indicative works area and Disturbance area footprints prepared by Tilt Renewables and the Native vegetation clearing area prepared by RPS were then overlaid on the map - The data from the Hydrography (dataset: DWER-031), Directory of important wetlands in Australia (dataset: DBCA-045), Geomorphic wetlands (dataset: DBCA-013, DBCA-015 and DBCA-019) and Farm dams (dataset: DPIRD-083) was combined and then overlaid on the map into one feature under the subheading 'Surface water features' - All vegetation type mapping of potential Carnaby's cockatoo foraging habitat across all project surveys and a site inspection (RPS and Tilt Renewables 2023, RPS 2023, Terrestrial Ecosystems 2022, Outback Ecology 2014) were then overlaid on the map under the subheading 'Potential Carnaby's cockatoo foraging habitat'. Additional potential Carnaby's cockatoo foraging habitat was identified by intersecting the Native Vegetation Extent (dataset: DPIRD-005) and the Vegetation Association 4, 7, 999, 1030, 1031 and 1035 of the Pre-European Vegetation (dataset: DPIRD-006). These datasets were considered representative of potential Carnaby's cockatoo foraging habitat for the reasons outlined in Section 5.3.2.5. Carnaby's cockatoo foraging signs identified by BCE (2025) and tall trees identified by Terrestrial Ecosystems (2022) were also overlaid on the map.
Figure P	Topography	- Datasets prepared by state government agencies: - Aerial imagery by Landgate - Conservation areas (DBCA-011) by DBCA 10m contours (DPIRD-073) by DPIRD - Datasets prepared by Tilt Renewables: - Project Area - Indicative works area - Disturbance area - Datasets prepared by environmental consultants: - Native vegetation clearing area	- DBCA-011 (Last updated: 18 February 2025) - DPIRD-073 (Last updated: 5 September 2022) - Project Area (Last updated: 17 May 2023) - Indicative works area (Last updated: 7 March 2025) - Disturbance area (Last updated: 26 February 2025) - Native vegetation clearing area (Last updated: 13 March 2025)	- Aerial imagery sourced from Landgate were overlaid with Conservation Areas data derived from DBCA (dataset: DBCA-011) - The Project Area, Indicative works area and Disturbance area footprints prepared by Tilt Renewables and the Native vegetation clearing area prepared by RPS were then overlaid on the map 10 m topographical contours (dataset: DPIRD-073) were then overlaid on the map

Figure ID	Figure title	Source data or other evidence used	Currency of dataset(s)	Methodology to create figures
Figure Q	Soil landscape mapping	- Datasets prepared by state government agencies: - Aerial imagery by Landgate - Conservation areas (DBCA-011) by DBCA - Soil landscape systems (DPIRD-064) by DPIRD - Datasets prepared by Tilt Renewables: - Project Area - Indicative works area - Disturbance area - Datasets prepared by environmental consultants: - Native vegetation clearing area	- DBCA-011 (Last updated: 18 February 2025) - DPIRD-064 (Last updated: 18 July 2022) - Project Area (Last updated: 17 May 2023) - Indicative works area (Last updated: 7 March 2025) - Disturbance area (Last updated: 26 February 2025) - Native vegetation clearing area (Last updated: 13 March 2025)	- Aerial imagery sourced from Landgate were overlaid with Conservation Areas data derived from DBCA (dataset: DBCA-011) - The Project Area, Indicative works area and Disturbance area footprints prepared by Tilt Renewables and the Native vegetation clearing area prepared by RPS were then overlaid on the map - Soil landscape systems (dataset: DPIRD-064) were then overlaid on the map
Figure R	Surface water	- Datasets prepared by state government agencies: - Aerial imagery by Landgate - Conservation areas (DBCA-011) by DBCA - Directory of important wetlands in Australia (DBCA-045) and Geomorphic wetlands (DBCA-013 and DBCA-015) by DBCA - Hydrography Linear (Hierarchy) (DWER-031) by DWER - Farm dams of Western Australia (DPIRD-083) by DPIRD - Datasets prepared by Tilt Renewables: - Project Area - Indicative works area - Disturbance area - Datasets prepared by environmental consultants: - Native vegetation clearing area	- DBCA-011 (Last updated: 18 February 2025) - DBCA-013 (Last updated: 18 September 2017) - DBCA-015 (Last updated: 13 September 2017) - DPIRD-083 (Last updated: 14 March 2022) - DWER-031 (Last updated: 20 June 2018) - Project Area (Last updated: 17 May 2023) - Indicative works area (Last updated: 7 March 2025) - Disturbance area (Last updated: 26 February 2025) - Native vegetation clearing area (Last updated: 13 March 2025)	- Aerial imagery sourced from Landgate were overlaid with Conservation Areas data derived from DBCA (dataset: DBCA-011) - The Project Area, Indicative works area and Disturbance area footprints prepared by Tilt Renewables and the Native vegetation clearing area prepared by RPS were then overlaid on the map - The data from the Geomorphic wetlands (dataset: DBCA-013 and DBCA-015) was combined and overlaid on the map into one feature under the subheading 'Surface water features'. Additional features Hydrography (dataset: DWER-031), Directory of important wetlands in Australia (dataset: DBCA-045) and Farm dams (dataset: DPIRD-083) were also overlaid on the map
Figure S	Aboriginal cultural heritage mapping	- Datasets prepared by state government agencies: - Aerial imagery by Landgate - Conservation areas (DBCA-011) by DBCA - Aboriginal cultural heritage places register (DPLH-099) by DPLH - Datasets prepared by Tilt Renewables: - Project Area - Indicative works area - Disturbance area - Datasets prepared by environmental consultants: - Native vegetation clearing area	- DBCA-011 (Last updated: 18 February 2025) - DPIRD-064 (Last updated: 18 July 2022) - DPLH-099 (Last updated: 15 April 2025) - Project Area (Last updated: 17 May 2023) - Indicative works area (Last updated: 7 March 2025) - Disturbance area (Last updated: 26 February 2025) - Native vegetation clearing area (Last updated: 13 March 2025)	- Aerial imagery sourced from Landgate were overlaid with Conservation Areas data derived from DBCA (dataset: DBCA-011) - The Project Area, Indicative works area and Disturbance area footprints prepared by Tilt Renewables and the Native vegetation clearing area prepared by RPS were then overlaid on the map - Aboriginal cultural heritage places registered under the <i>Aboriginal Heritage Act 1972</i> (WA) (dataset: DPLH-099) were then overlaid on the map. Additionally, the location of the Billinue Aboriginal Community was overlaid on the map

Figures

Appendix A: **Request for further information**

Appendix B: **DCCEEW request for additional information** **checklist**

Appendix C: **Carnaby's Black-Cockatoo and Fork-tailed Swift utilisation survey report**

Appendix D:
**EPBC Act listed threatened and migratory
species occurrence records from
2024/2025 surveys**

Appendix E: **Targeted star sun orchid and sandplain duck orchid searches**

Appendix F: Black cockatoo tracking data

Appendix G: **Reconnaissance flora and vegetation assessment**

Appendix H: **Black cockatoo habitat assessment**

Appendix I: **Supplementary flora, vegetation and fauna survey**

Appendix J: **Spring flora and vegetation survey and black cockatoo habitat survey**

Appendix K: Fauna assessment

Appendix L: **Avifauna Assessment**

Appendix M: **Targeted level 1 vegetation and assessment**

Appendix N: **Tilt Renewables' Environmental and Sustainability Policies**

Appendix O: EPA determination

Appendix P: **Previous planning approvals**

Appendix Q: **Lots, road reserves and Crown land parcels for the Proposed Action**

Appendix R: **Native vegetation types and vegetation condition within the Native Vegetation Clearing Area**

Appendix S: **EPBC Act Protected Matters Report**

Appendix T: **Badgingarra Wind Farm reports**

Appendix U: **Yandin Wind Farm reports**

Appendix V: **Confirmed and potential breeding trees**

Appendix W: **Collision risk assessment for Carnaby's cockatoo and migratory species**

Appendix X: **Proposed action planning approval**

Appendix Y: **Significance of impacts assessment**

Appendix Z: **Draft Bird and bat management plan**

Appendix AA: **Offset Management Strategy**